

# BASIC BOOK REPAIR MANUAL

A COOPERATIVE PUBLICATION OF THE

Ohio Preservation Council



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This publication is a compilation of pages from previous OPC training manuals:

**Conservation Workshop** sponsored by the Ohio Cooperative Conservation Information Office, Rebecca Winkle, Director. Prepared by The Conservation Center, University of Cincinnati, 1984, 1985.

**Book Conservation Workshop June 24-25, 1996**, CAC Preservation Lab, Bowling Green State University by Ginni Wisniewski and illustrated by Scott Hofmann, 1996.

**Basic Book Repair Manual: A Cooperative Publication of the Ohio Preservation Council and the State Library of Ohio**, 2001 (Excerpts and revisions of above mentioned texts with additions. Revised and digitized by OPC in 2009).

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## INTRODUCTION

Welcome to this 2009 digital edition of *The Basic Book Repair Manual*, presented in 2001 by the Ohio Preservation Council and the State Library of Ohio. Like the earlier version this 2009 manual's purpose remains the same, to provide information to "those individuals charged with the care and maintenance of paper-based resources within libraries, historical organizations and other repositories where a fundamental understanding of proper treatment of such collections is essential."

It is worth repeating that "OPC has a fine tradition of offering quality training begun under its predecessor, the Ohio Cooperative Conservation Information Office (OCCIO). Good training is not quite enough however without a good manual of fundamental techniques to reinforce what Ginny Wisniewski, the principal trainer for the earlier OCCIO workshops, taught." Ginny graciously provided permission for OPC to continue to bring basic book repair and paper treatment techniques to a broader audience via the web. The 1996 manual she prepared with drawings by Scott Hofmann was incorporated in both the 2001 and this 2009 update. Specific treatment instructions from earlier 1984, 1985 OCCIO workshops have been retained as well. Other contributors include Harry Campbell (Hinged Tube Repair) and Hedi Kyle (Self Closing Wrapper). OPC members who provided updates, additions, editing and assistance included Ellie Bambakidis, Sue Dunlap, Eric Honneffer, Sharlane Gubkin and Wendy Langdon.

10-27-09



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## **Selection of Circulating Volumes for Repair**

The following criteria pertains to predominantly hard rather than soft cover volumes. Many libraries may not have a contract with a commercial bindery or have staff to exclusively handle collection repair issues especially if their holdings are primarily soft cover and replaced with some frequency.

### **I. Before doing any repair consider the volume's:**

**Value** – Importance to the collection. Volumes designated as historic or unique should be handled separately from the circulating materials. They should be protected from environmental damage and excessive handling. If they require repair or other treatment, a conservator could be consulted.

**Use** – Heavy or light use?

**Condition and Size**– Oversized materials will require special handling, storage and repair considerations.

**Brittle Paper** – If it fails the *fold test* (turn book upside down and fold page corner in one direction then in the other direction. This is one fold. If paper breaks after three folds or less, it is considered brittle) and the volume must be kept available, then consider a reprint, a preservation photocopy or an alternate format such as microfilm or boxing or tying the volume and limiting its access.

### **II. If the paper passes the fold test and you have in-house repair resources available, the volume qualifies as a minor repair if the following pertain:**

There are no more than two pages in succession that are loose. A few loose pages or plates (not signatures or gatherings of pages) throughout the text can be reattached -**Tip-In** with archival adhesive.

There are minor page tears. **Mend** with archival document repair tape.

There are loose hinges – **Hinge Tightening** with archival adhesive.

There is spine damage but the cover boards are firmly attached – **Spine Repair**.

**III. If the paper passes the fold test, but the volume has more extensive damage, major repair or rebinding would be required if the following pertain:**

The case has separated from a well sewn text block – **Re-Casing** using the original cover.

The hinge paper is torn but the mull or super is intact – **Endsheet Replacement or Rebinding.**

The case is not intact, textblock sewing is damaged and over two pages in succession are loose - **Rebinding** should be considered .

**IV. Evaluate collection condition frequently to keep volumes from requiring more extensive repair or rebinding.**

Eric Honneffer  
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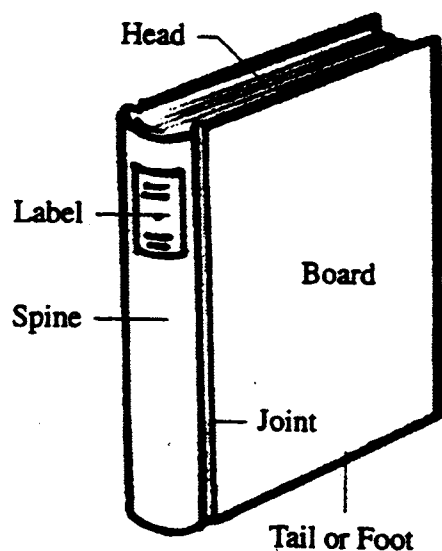
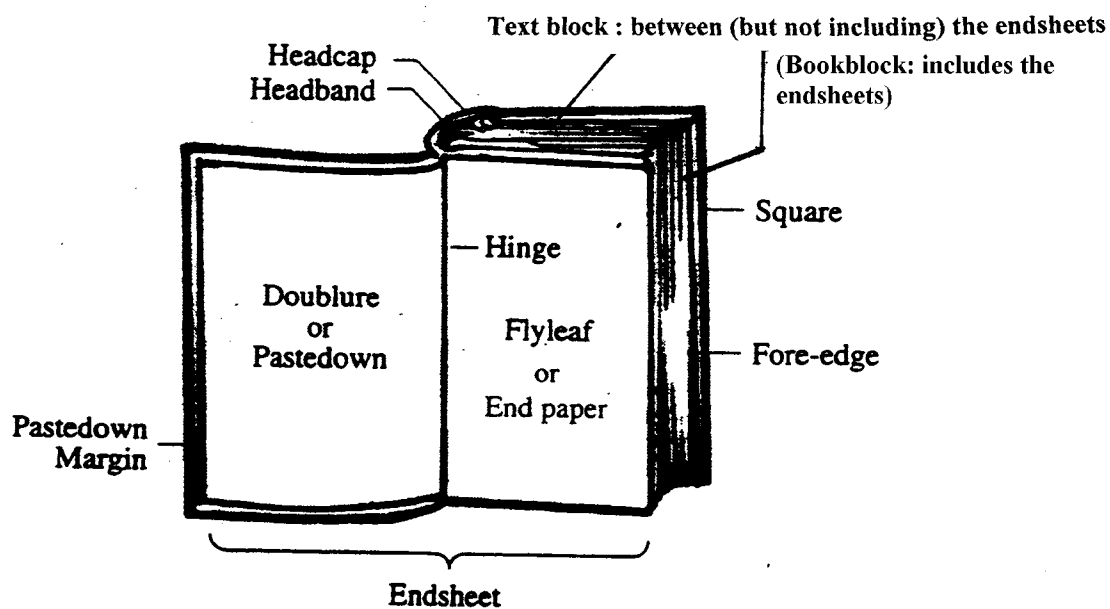
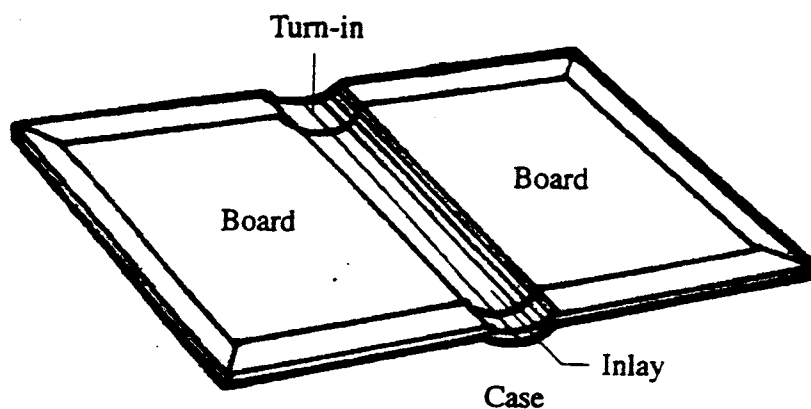
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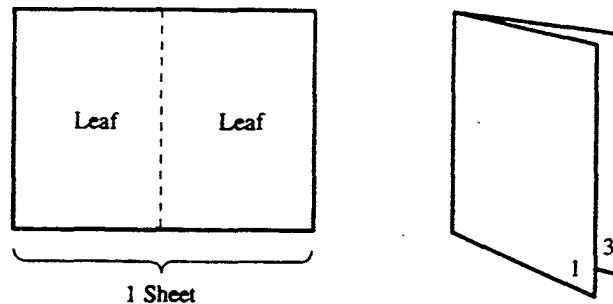
## HOW A BOOK IS MADE

A sheet of paper is printed on both sides and then folded one or many times. The folded sheet forms a unit called a signature or gathering. The size of the gathering depends on the size of the original paper sheet and the number of folds. Visualize the way a sheet is printed and folded to make different formats.

### FOLIO One fold.

Fold the sheet in half. Number the four sides of the folded sheet in order. When you unfold the sheet, you'll see how it was printed.

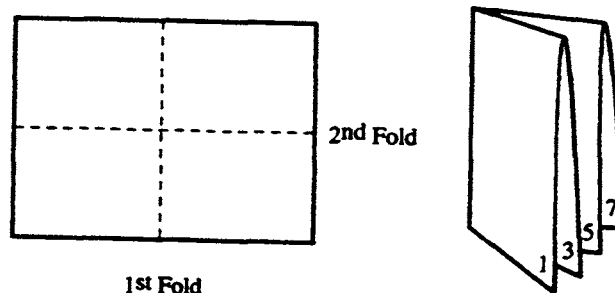
1 sheet = 2 leaves = 4 pages



### QUARTO Two folds.

Follow the same procedure, this time making two folds. Number the eight sides of the pages.

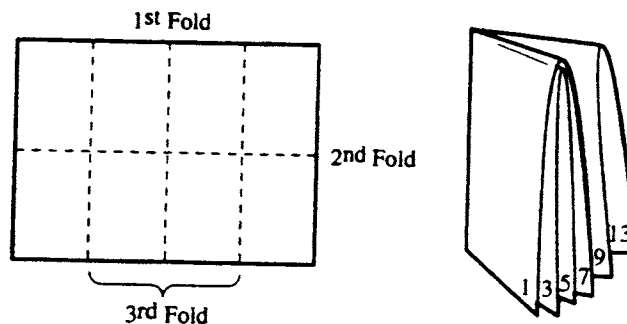
1 sheet = 4 leaves = 8 pages



## OCTAVO Three folds

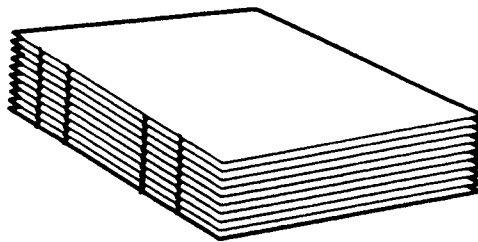
Follow the same procedure adding a third fold. Number the sides of all pages. It will be difficult to number the sides 10 and 11 and 14 and 15 because they are inside the fold, but it is possible. The octavo is the most common format.

3 folds = 8 leaves = 16 pages

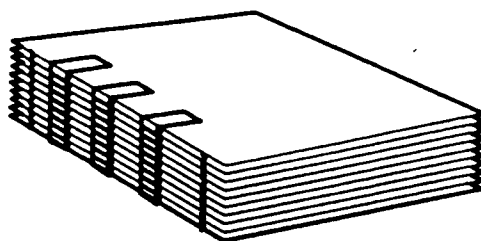


FOLDED GATHERINGS CAN BE SEWN TO EACH OTHER IN ONE OF TWO WAYS:

By a continuous thread running along the inside of the fold and coming out to form a chain stitch. In sewing, the needle is parallel to the plane of the paper.



By continuous thread coming out of the fold and passing around a cord or tape. The sewing threads inside the folds cause swelling at the spine so that the book is slightly pie shaped.



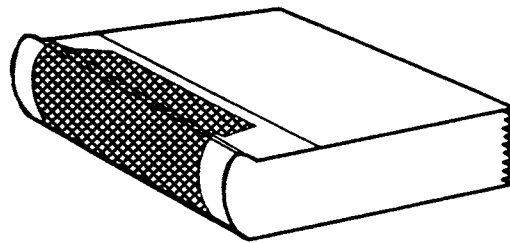


When the gatherings are sewn into a unit by one of the two methods, it is called a "textblock".

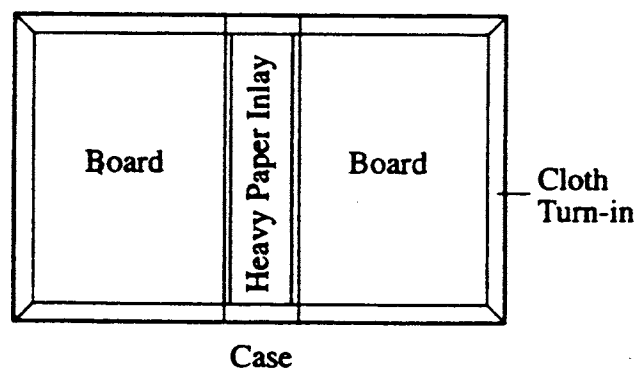
When a folded sheet of blank paper called an endpaper (or endsheet) is added to the front and back of the textblock it becomes a "bookblock".

An adhesive is brushed on the spine to help hold the gatherings in alignment then trimmed. It is shaped by rounding and backing to help distribute the swelling from the sewing. The spine is lined with paper, sometimes with endbands at head and tail of the textblock.

Most books made presently have the cover made off the bookblock and then adhered to it. This is called a case binding.



The case is made of two boards and a paper spine lining that are adhered to cloth, paper or other material. The narrow area between the spine lining and the boards is without any lining material to facilitate the cover opening easily. The title is stamped on the spine of the case and the book is ready to be cased in. A case that fits well protects and supports the textblock.



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## **GLOSSARY**

**ACID-FREE:** A term used to indicate when materials are either pH neutral or alkaline buffered.

**ACID MIGRATION:** Transfer of acid from one material to another by direct contact or by vapor transfer.

**ADHESIVE BINDING:** Single leaves held together by an adhesive (usually PVA) rather than any form of sewing or mechanical attachment.

**BINDING:** Folded sheets or single leaves attached at one edge and protected by a cover.

**BINDING EDGE:** The edge of a bookblock that is held together by sewing or adhesive.

**BLOTTER:** Thick unsized paper used to absorb moisture.

**BOARD:** A stiff, comparatively thick paper product used in making cases and other protective covers.

**BOARD SHEARS:** A heavy-duty cutter in which materials are held in place with a pressure bar while being cut. A measuring gauge helps with multiple cutting.

**BOOKBLOCK:** All the pages of a book's text before it receives its covers, including the endsheets

**BOOKCLOTH:** Stiffened cloth made specifically for bookbinding.

**CASE:** A protective cover made separately and then attached to the book, as opposed to a binding where the board are laced to the bookblock before covering.

**CASING IN:** Attaching a case to a bookblock.

**CHAIN LINES:** Lines 1" apart that are parallel to the short side of handmade paper.

**CHAIN STITCH:** A stitch that catches up previous sewing threads but is not sewn to a cord or tape.

**CONJUGATE LEAVES:** Two leaves forming one piece of paper.

**ENCAPSULATION:** Enclosing a document between two sheets of polyester film by ultrasonic welding, sewing or by using archival double-sided pressure sensitive tape

**ENDSHEETS:** Blank or decorated papers at the front and back of a text. Also called endpapers.

**FOLIO:** A sheet of paper folded once, forming two leaves, four pages.

**FORE-EDGE:** The edge of a book that opens.

**GATHERING:** See signature.

**GRAIN:** The direction in which fibers of paper run, or align, and paper materials bend most easily.

**GUARD:** A strip of material, usually paper, used to join two leaves that are damaged or apart but should be conjugate.

**GUTTER:** The area inside a book that is adjacent to the binding edge.

**HEAD:** The top edge of a book.

**HINGE:** A piece of paper attaching a leaf into the textblock.

**JOINT:** The area between a board and the shoulder of a book on the outside of the case.

**LACUNA:** A missing part of a page in a book or of a document.

**LEAF:** A piece of paper consisting of two pages, one on each side.

**MULL:** A lightweight, coarsely woven clothlike crinoline used to line the spine of a text.

**OCTAVO:** Folding a sheet of paper three times, making eight leaves, sixteen pages.

**ORIENTAL SEWING:** Sewing in which the thread goes through the bookblock at a right angle to it and also goes around the spine.

**PAGE:** One side of a leaf.

**PASTEDOWN:** A piece of paper pasted to the inside of the cover front and back. It can be the first leaf of the endpapers or a separate leaf.

**POCKET:** A container for loose materials that attaches to the inside of the back cover.

**POLYESTER FILM:** A chemically inert, stable, clear polyester that will not discolor, damage or adhere to materials, example: Mylar D film

**PRESS:** A machine used to exert pressure and hold a book in a certain position

**PVA:** Polyvinyl acetate emulsion, a very strong adhesive.

**QUARTO:** A format produced by folding a sheet of paper twice, making four leaves , eight pages.

**REEMAY:** A man-made spun bonded polyester fabric. The special weave permits water to pass through, retaining its strength even when wet and allowing items to dry without sticking to the Reemay.

**REVERSIBLE:** Capable of being undone.

**SCORE:** An indentation in paper or board made by running a blunt point along the line to be scored

**SHEET:** A full piece of paper.

**SHOULDER:** The part of a bookblock that is fanned out : the outer edge of the curved spine against which the boards fit.

**SIGNATURE:** A set of folded pages forming a unit.

**SPATULA (MICRO-SPATULA):** A small thin metal spatula used to lift paper, book cloth, staples and other materials; also used to apply small amounts of glue and to scrape away old glue and other residue.

**SPINE:** The bound edge of a book.

**SPINE LINING:** Cloth, paper, mull that covers the spine.

**SQUARE:** The portion of the board of a binding that extends beyond the bookblock.

**STUB:** An existing or added projection from a leaf that can be folded for sewing

**TAIL:** The bottom edge of a book.

**TAPE:** Linen or cotton tape, from 1/4" to 3/4" wide, to which gatherings of a book are sewn.

**TEXTBLOCK:** All the pages of a book's text before it receives its covers, excluding the endsheets

**TIP IN:** Replacement of missing parts of books or pages of books that are attached to the text with a thin line of adhesive on the binding edge.

**TISSUE:** Very light paper, usually Japanese paper, used for mending.

**TURN-IN:** The covering material turned in around the edge of the cover board.

**WRAPPER:** A protective cover made of thin board.



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## MATERIALS USED IN BOOKS

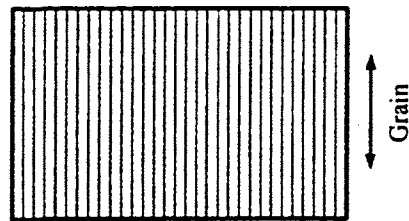
All materials used in making books have behavior patterns that affect each other and the functioning of the book. Each of these materials, the paper used in the text, the board used in the binding and the cloth or paper that covers the binding have two elements - grain and cross grain.

### PAPER

Paper grain is created by the alignment of fibers as the paper is fabricated. It allows the paper to bend more easily in one direction than in the other direction. In books, the bending and flexing is parallel to the spine of the book. Contrarily resistance felt horizontally "cross grain" can cause the paper to stretch and cockle. There are several ways to determine grain direction.

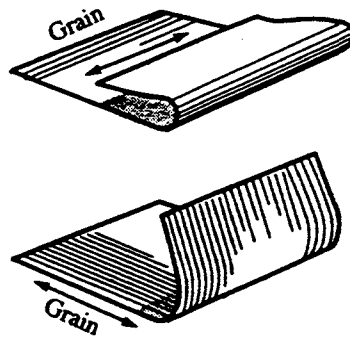
#### VISUAL

Some papers such as handmade Western or Japanese papers will have what is called "chain lines". They are about 1" apart and become visible when the paper is held up to the light. The grain is always parallel to these lines.



#### BENDING

When bending paper in one direction and then in the other direction there is less resistance in one direction than in the other. The grain will have the least amount of resistance.



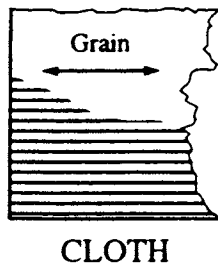
#### WETTING

Wet a piece of paper on one side and watch it curl into a roll. This indicated that the grain runs parallel to the curl.



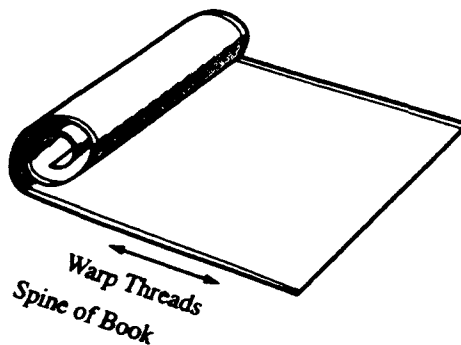
## TEARING

When paper does not have chain lines the grain can be found by tearing it in one direction and then in the other direction. If the tear is made more easily and reasonably straight the grain is in the direction of the tear. When a tear is across the grain the tear will be irregular and very likely feathered (split).



## CLOTH

Any cloth used for binding should be cut so that the warp threads are parallel to the spine of the book.



## ADHESIVES

Adhesives used in book repair include polyvinyl acetate (PVA, a man-made adhesive), paste made from pre-cooked flour, rice starch, corn starch, or wheat flour paste, and methyl cellulose.

### PVA

PVA is a white liquid that is flexible, fast drying, keeps well for several months, but it should never be subjected to freezing temperatures. Because it is thick when it comes from the bottle, it can be thinned with water to make it spread better. The main drawback is that it is not reversible in water. Brands commonly used include Elvace, Jade 403, Promatco and some of the newer "reversible" adhesives. Elmer's Glue is a PVA but is not recommended for conservation work because it dries rigid.

### METHYL CELLULOSE

Methyl cellulose is a white granular solid that is made soluble in water. Methyl cellulose is slow drying, is quite flexible, and is easily removed with water. It is generally not used by itself but when made soluble and mixed with PVA in a 50/50, 20/80 or 40/60 combination the mixture is an excellent all around adhesive. This mixture does not need to be refrigerated.

#### To mix methyl cellulose:

- Add 5 level tsp. methyl cellulose granules to
- 2 cups water and mix well
- Let stand several hours, stirring occasionally before mixing with PVA.
- If too thick, add water to make desired consistency.

### PASTE

Pastes have been used safely for centuries. They are made from natural ingredients generally prepared by cooking starch and water, stirring constantly over medium heat until it is translucent. When making pre-cooked flour paste the powder is sprinkled into water while beating it to the desired consistency. Paste is fairly flexible if applied thinly and is slow drying. If too thick, paste can be thinned with water and can be removed with water. It can cause paper to stretch if the paste is too watery. One of the drawbacks is that it will mold quickly but can be kept successfully up to a week in the refrigerator.

### PASTE/MIXTURE

A recent innovation is a mixture made of paste, PVA, and methyl cellulose. This does not eliminate the use of the traditional nature of PVA and methyl cellulose, but it does give an added dimension to paper repairs and can be used as a substitute for paste used alone. It spreads easily and allows what is being worked on to be lifted and repositioned if necessary, there is minimal stretch and there is improved reversibility over PVA/mixture.

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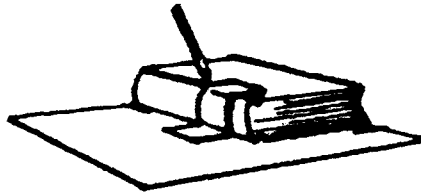


## WORKING TIPS

**MEASURING:** Develop a sense of measurement and make a practice of trusting your eye and approximating 1/2 ", 1", 2 " etc.

Recheck precise measurements before cutting to avoid error and wasting material.

It is impossible to measure a curved surface accurately with a ruler. Use a strip of paper laid on the curved surface and indicate the measurement with a pencil mark. Transfer the measurement to the material being used.



A plastic transparent ruler helps view exact lengthwise measurements on materials.

### CUTTING:

Always determine the grain of the material to be used before starting.

When cutting with a scalpel several light strokes rather than one heavy stroke gives better cutting results.

Use a self-healing cutting mat whenever possible when cutting with a scalpel. The cut is cleaner and the blade will last longer.

### PASTING:

Place oversize waste paper under the material being pasted.

Brush adhesive from the center of the material outward off the edge onto the waste paper. This practice avoids having adhesive getting under the material and staining it.

Insert wax paper between a newly pasted surface and adjacent material to prevent the transfer of moisture or excess adhesive from one to the other.

A thin coat of adhesive evenly applied is all that is needed for good adhesion. Too much adhesive oozes, stretches material and/or makes stains difficult if not impossible to remove successfully.

## CARE OF BRUSHES:

Synthetic brushes work best with PVA mixture and wash out more easily, than natural hair brushes.

Match the size of the brush to the area being covered.

Fill the mixture container just a bit lower than the top of the brush bristles. This practice allows you to control the amount of adhesive on the brush and the bristles will clog less.

Submerging a brush in a jar with a small amount of water keeps the bristles supple when not in use. Keep a clean cloth handy to remove the water from the bristles before using it again.

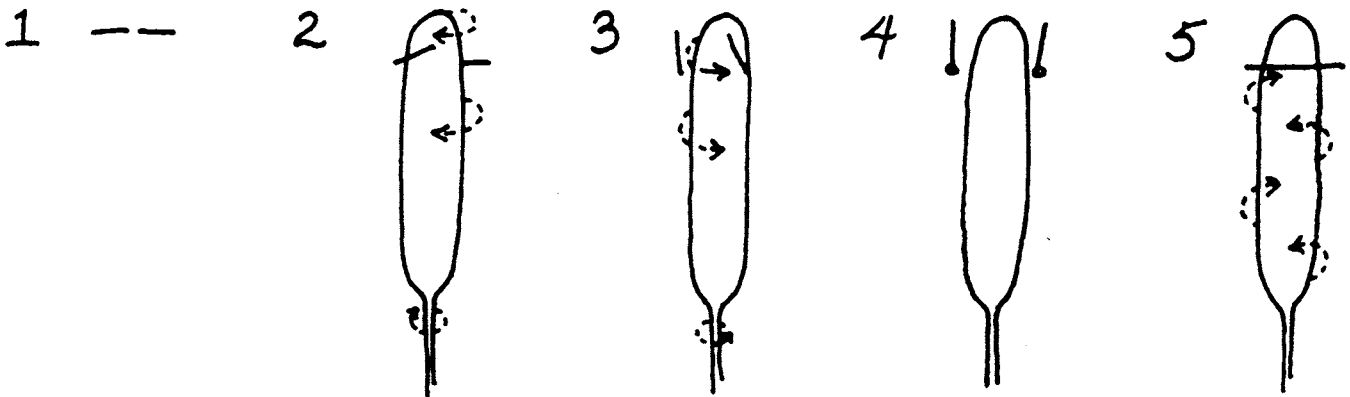
Always wash brushes thoroughly with warm water and plenty of soap to work out any residue of adhesive. Squeeze out excess water with your fingers and cloth. Reshape the brush into its original shape.

Place finished repairs under a weight and leave overnight to completely dry.



## REMOVING STAPLES:

Using micro-spatula gently insert under staple prongs and; straighten each prong. Turn paper over and use spatula to lift staple from paper.



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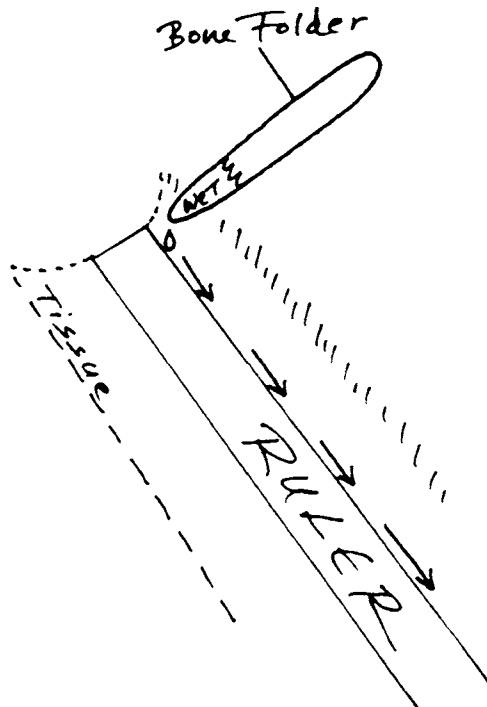
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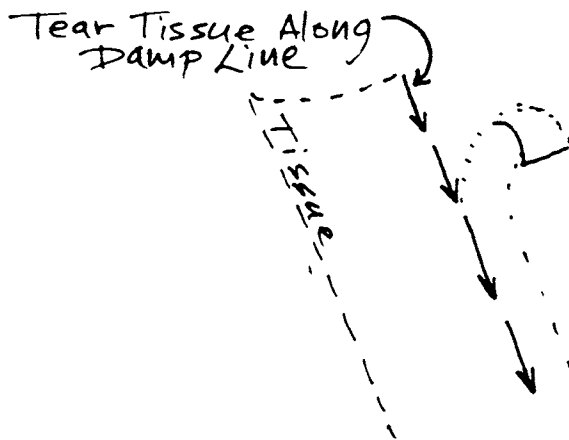
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## TEARING MENDING TISSUE:

Score tissue using ruler and bone folder or a small pointed brush which has been dipped in water.



Tissue will separate by gently pulling apart along the damp line.

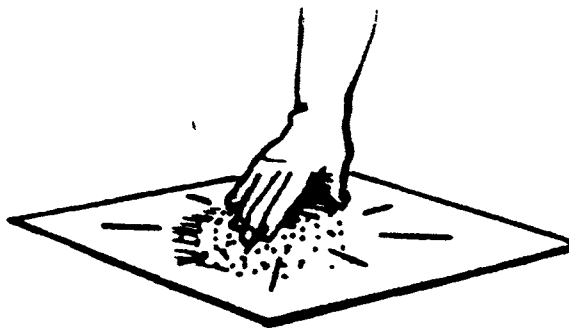


## DRY CLEANING

A safe way to clean paper, no matter if it is a page in a book or a document, is to use the crumbs of grated erasers. A Magic Rub eraser or an Art Gum eraser works extremely well. With a four-sided plastic grater a person can make a good supply of crumbs at one time, or with a small hand held grater just enough crumbs for the immediate need can be made.



One's fingertips move the crumbs carefully over the surface of the paper to pick up the surface dirt, using a circular motion moving out to the edges. Soiled crumbs are brushed off the paper with a soft sable brush. If not too dirty the crumbs can be used again, otherwise they are thrown away. Be very gentle-moving the eraser crumbs too vigorously may tear fragile paper or damage its surface!





## FLATTENING

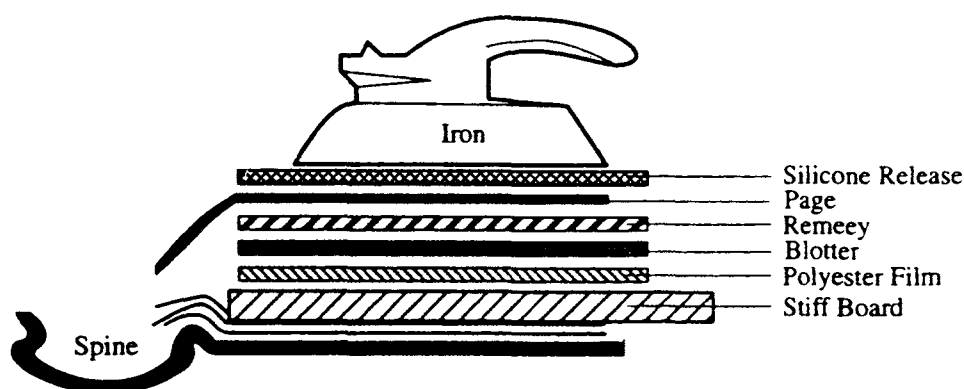
Sometimes the half title page, the frontispiece, the title page or a leaf in the text becomes folded or crumpled. It may or may not be detached from the text. The leaf may have badly frayed edges and/or parts missing. Before any repairs can be made the leaf must be flattened.

One method is to insert a thin stiff board layered with polyester film, blotter and Reemay under the leaf. If the leaf is attached to the text it is lightly misted/spirited with water from a spray bottle. Place silicone release paper over the dampened leaf. Then with a tacking iron or a regular iron set at a low setting dry the leaf by pressing the creases but not rubbing the leaf with the iron as this encourages the leaf to curl.

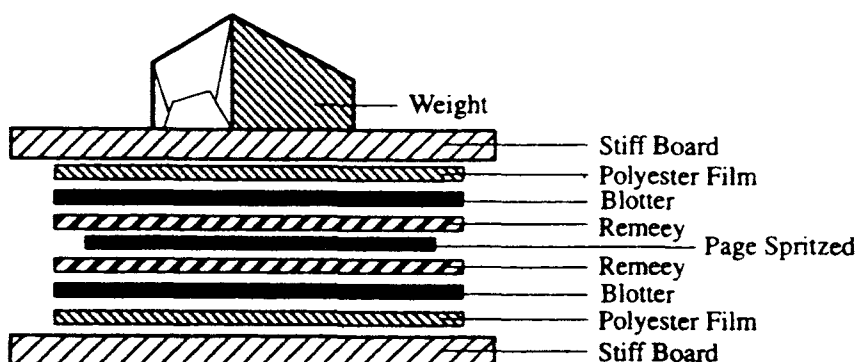
A second method is to make a sandwich with polyester film, blotter and Reemay on each side of the leaf that is lightly spirited with water to relax the paper. Place a board with a weight on top until dry.

When the leaf is flattened the decision about extensive mending is made. If the book is from the circulating collection an alternate solution to making repairs might be considered. Backing the leaf with heat-set tissue is one solution (See the section on mending with Heat-set tissue). Making a photocopy of a badly damaged leaf and tipping it in can be another solution.

First Method



Second Method



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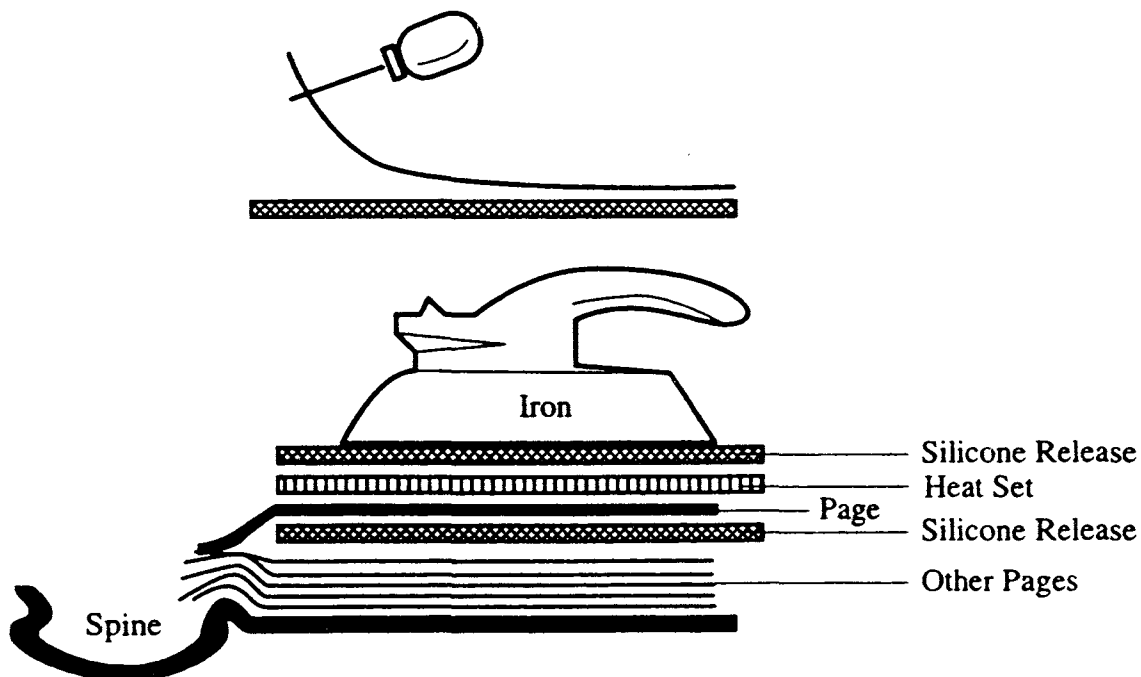
## TEAR REPAIR

Two kinds of tears are found in books. The first kind is in the direction of the paper grain and referred to as a "straight" tear. The second kind refers to tears that are across the grain and have overlapping "feathered" fibers. It is not uncommon for both types to be combined when the tear is in two directions. It is important that text and/or illustrations be matched carefully when the mending is done. The methods of repair are heat set repair, Japanese tissue and archival tape.

### HEAT-SET REPAIR

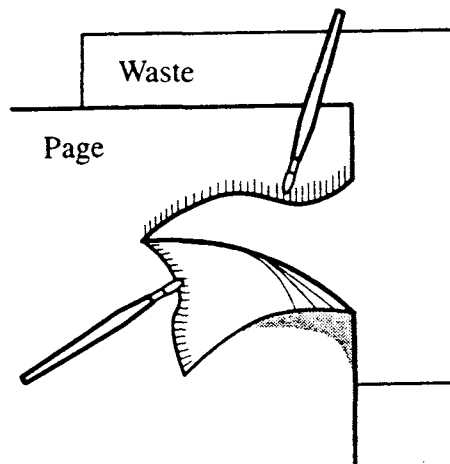
Mending can be done "dry" (without paste or PVA) with heat-set tissue. Lens tissue with acrylic adhesive on the back is mounted on a carrier. The adhesive is activated with heat and pressure. The tissue with its carrier is cut slightly larger than the size of the mend before being lifted off the carrier and placed over the tear. Silicone release paper is placed under and over the leaf being mended insuring that the tissue will not stick to other leaves.

When preparing heat-set tissue for straight tears the mend is reinforced with a small extension of the tissue that is folded under the back of the tear and attached at the same time. When mending a feathered tear the overlapping parts are first adhered together with PVA/paste before attaching the tissue. A small extension folded over the edge of the tear is appropriate. This is an easy repair, but it is not recommended for special or rare materials. as it is not easily reversible. Crompton, Cerex, and Neschen are known heat-set tissues.

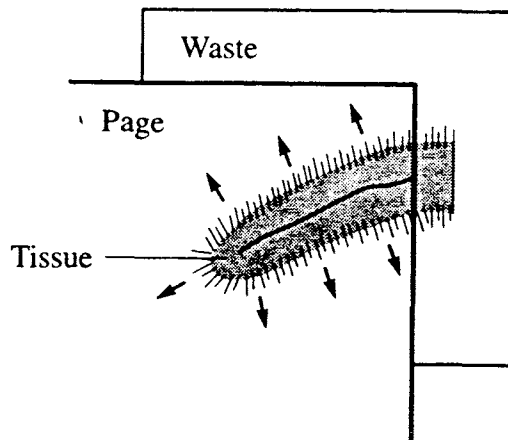


## JAPANESE TISSUE REPAIR WITH PASTE

Select a tissue that best complements the text paper in color but slightly lighter in weight. Using an awl or a wet watercolor brush shape the tissue so that it extends 1/8" to 1/4" on each side of the tear. If the tear is feathered apply a small amount of paste mixture to both edges of the tear and carefully align the text before proceeding.



Place the tissue on a piece of Plexiglas, glass or waste paper and apply a thin coat of paste or a combination of paste/mixture to the tissue. Leave a short tail so the tissue can be lifted off easily and positioned over the tear. Align the text placing a small weight on each piece to keep them in place if necessary. Place Reemay and a blotter over the mend under a weight until dry.



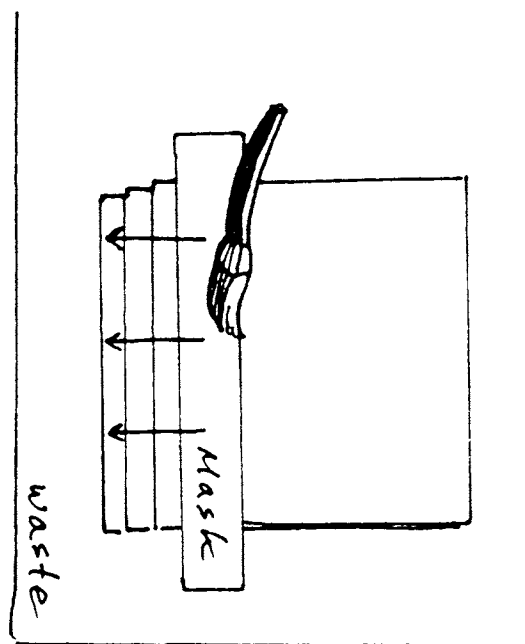
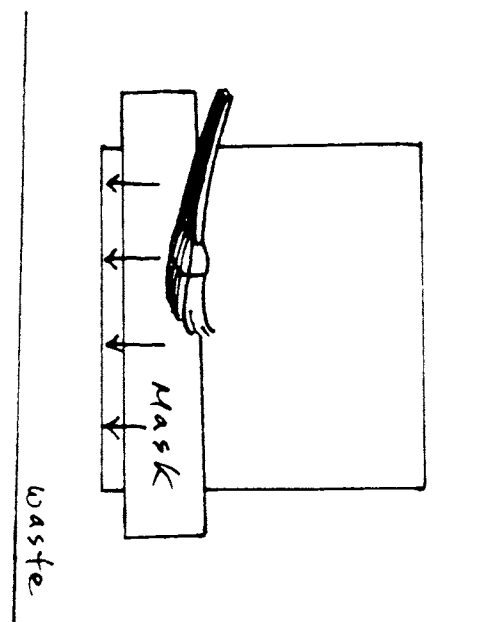
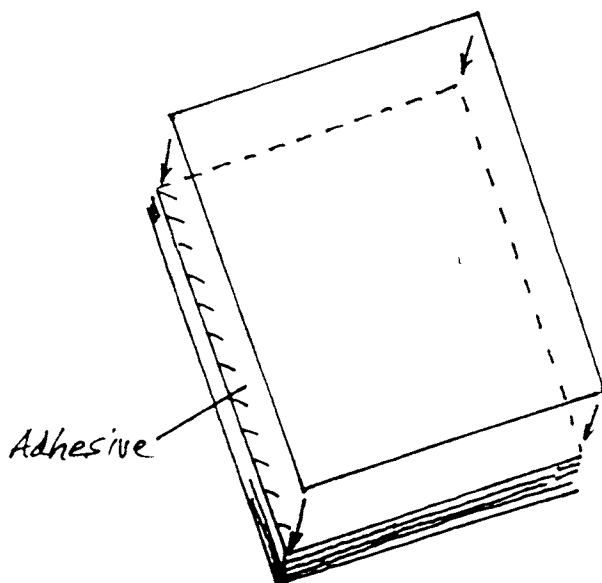
## ARCHIVAL TAPE

Archival tapes (such as Filmoplast-P) may also be used to repair tears on pages of modern books of low artifactual value. Like heat-set tissue, it is not easy to remove.

## TIPPING

Tipping is a way of inserting a single leaf, an errata slip, a photocopy, etc., as deeply as possible into the gutter of the text. A thin line of mixture no wider than 1/4" is applied to the gutter edge of the leaf. Carefully ease the leaf as far as possible into the gutter making sure it is flush at the head and tail of the text. There is always a problem with tipping when too much adhesive is on the edge of the leaf and it bleeds into the printed text making it unreadable.

Multiple leaves can be inserted into a volume if the binding can accommodate the thickness. Put the top leaf aside and fan the other leaves with 1/8" to 1/4" showing. Mask the top leaf and brush mixture on the fanned leaves. Bring the leaves together with the top leaf placed on top so that they are flush at the foreedge. Press. When dry proceed with tipping as described above. The unit can also be hinged and inserted into the text as described in the next section



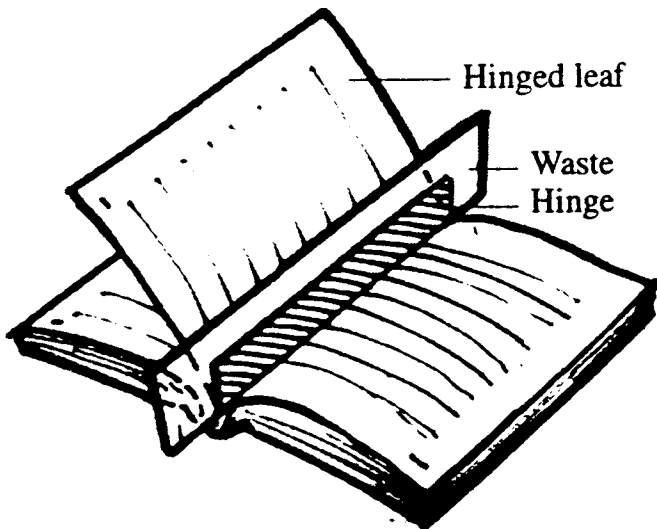
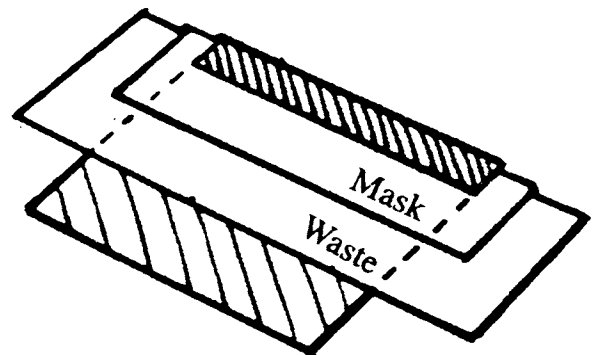
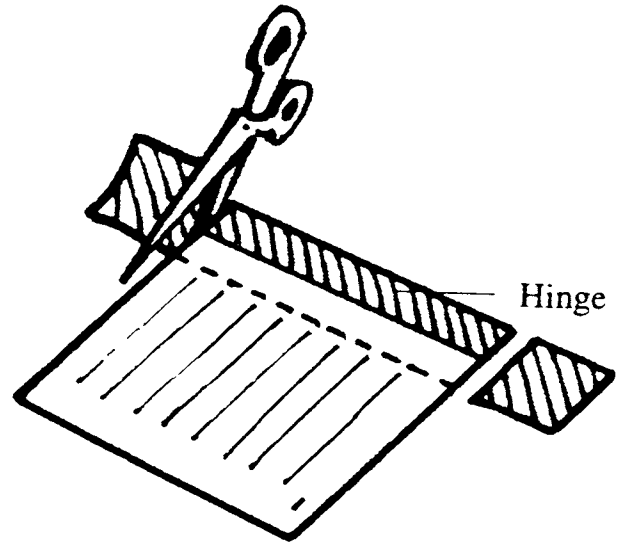
## HINGING

Hinging is an excellent method of inserting single and multiple leaves into a text because it allows the leaf to function as all other leaves in the textblock.

Tear a strip of Japanese tissue 1/2" to 3/4" wide. Make sure the grain of the tissue is going in the same direction as the paper you are hinging.

Mask the leaf being hinged leaving 1/4" exposed along the gutter side. Brush paste with mixture onto the length of the leaf. Remove the waste paper and position the tissue over the adhesive; remove any excess moisture with a blotter. Trim the hinge flush at the top and bottom of the leaf. Dry under light pressure.

When dry, fold the loose part of the hinge back on itself. Place waste paper under the tissue and brush paste with mixture on the hinge. Open the book to the place where the leaf is to be inserted and carefully ease the leaf into place deep in the gutter. Insert a piece of wax paper so the leaves won't stick together. Place the book under a weight until the mend is dry.



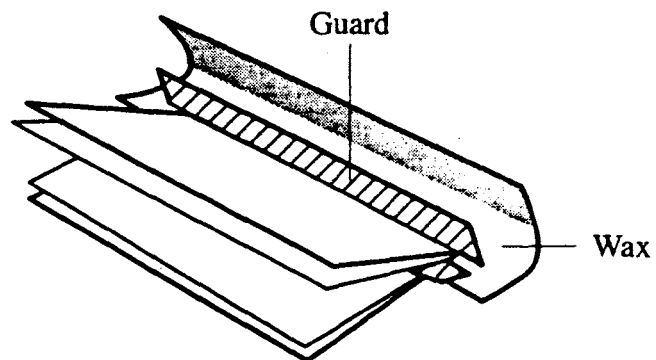
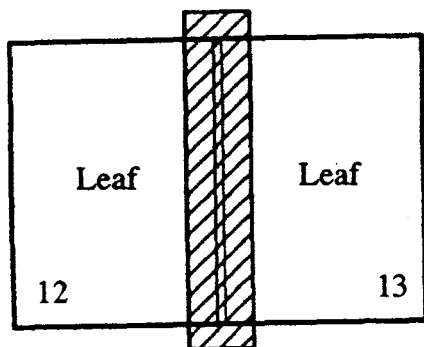


## GUARDING

Gatherings (signatures) that have damaged or broken folds must be mended (guarded) with Japanese tissue before being resewn to the text. The gathering must be complete with leaves conjugate. All bits of old glue are removed and folds flattened with a bone folder.

Tear a supply of guarding strips  $5/18"$  to  $3/4"$  wide by scoring/tearing with a bone folder dipped in water or a wet watercolor brush. Make sure the strips are a slightly lighter weight than the paper of the pages you are guarding and that the grain of the strips is going in the same direction as the grain of the paper being guarded. Brush paste/mixture on the guard that is on a piece of glass, Plexiglass or waste paper. Leave a short tail on the guard so it will be lifted up easily. Place the lifted guard onto a piece of wax paper or Remay with the paste side up. Center the conjugate leaves lengthwise on the guard. Pull the wax paper with guard firmly up and over the fold and press it into place. Blot off any excess moisture

Guarding starts with the innermost folio with the guard placed on the inside. Each subsequent folio is aligned at the foredge with the previous folios and the guards are attached to the outside of the folios. Each fold is guarded for the entire length even if only partially broken. The guard fills in any part of the fold that is missing. Carefully unfold each newly guarded fold and make sure that all edges are securely attached to the guard and blot out any excess moisture. Place the folio back in place and continue guarding. Gatherings can be partially air dried and then put under a lightweight to finish drying. Trim guards flush at top and bottom of gathering.



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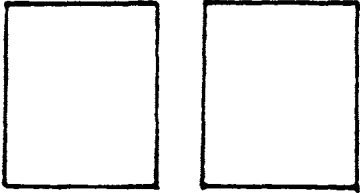
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## SINGLE SIGNATURE PAMPHLETS

You will need:

### Two Lig-free Cover Boards



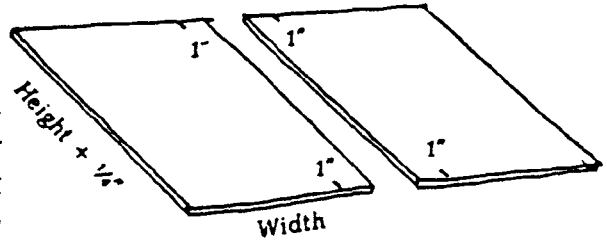
### Cloth Hinge for Cover



### Cloth Hinge for Pamphlet

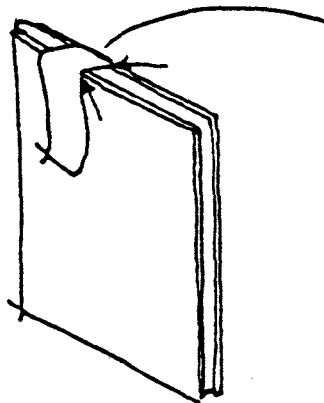


1. Cut boards  $H + 1/4"$  X  $W$  and mark off 1" at head and tail of each board. If desired, pamphlets smaller than 4" x 6" may be bound in 5" x 8" binders so they will not get "lost" on the shelf.
2. To determine the width of both cloth hinges - sandwich the pamphlet between the cover boards. Wrap a strip of paper around the unit and mark the outer edges of the boards on the paper. Add  $2 \frac{1}{4}"$  to this measurement for the exact width of cloth hinges.



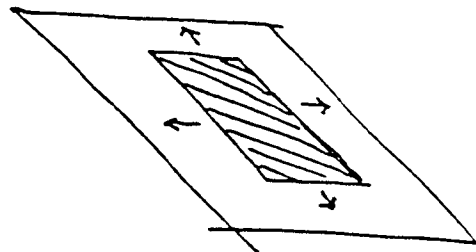
Example: If the pam/board sandwich is  $1/2"$  and  $2 \frac{1}{4}"$  is added, the width of each hinge is  $2 \frac{3}{4}"$ .

3. Cut one cloth strip the exact height of the pamphlet. Cut the other strip the height of the boards +  $1 \frac{1}{2}"$ .

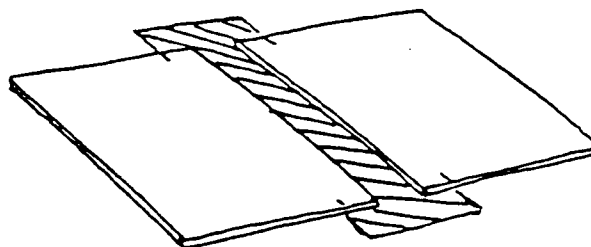


## Constructing the Pamphlet Cover

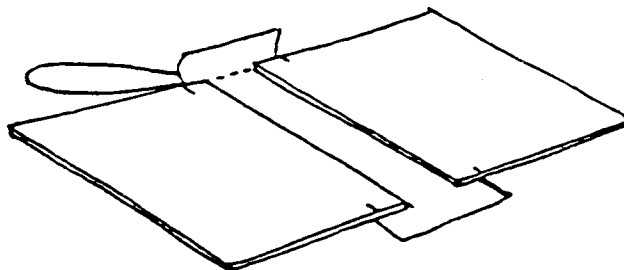
Place the cloth strip on waste sheet and apply PVA mixture to the cloth in the direction of the arrows.



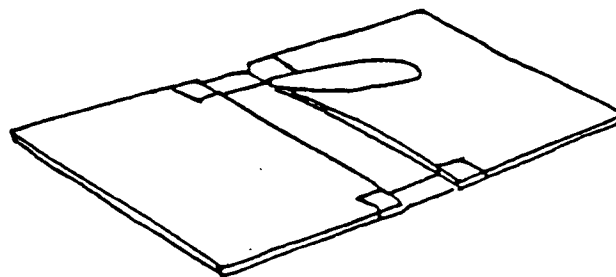
Throw away the waste sheet, and position the boards on the adhesived cloth, lining up the pencil marks with the edges of the cloth



Turn the cloth tightly around the boards, rubbing along the edge of the boards with a bone folder.



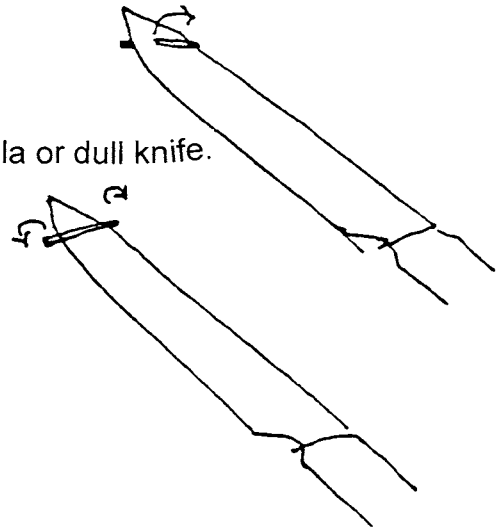
Work the cloth down between the boards with the bone folder. Put completed cover between wax paper and put under lightweight.



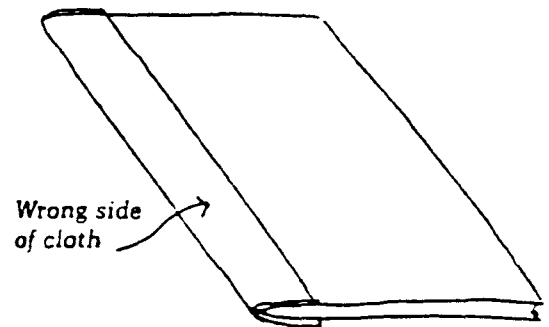
## Preparing the Pamphlet

1. Open pamphlet to the center and remove the staples. Bend up the legs with a micro-spatula or dull knife.

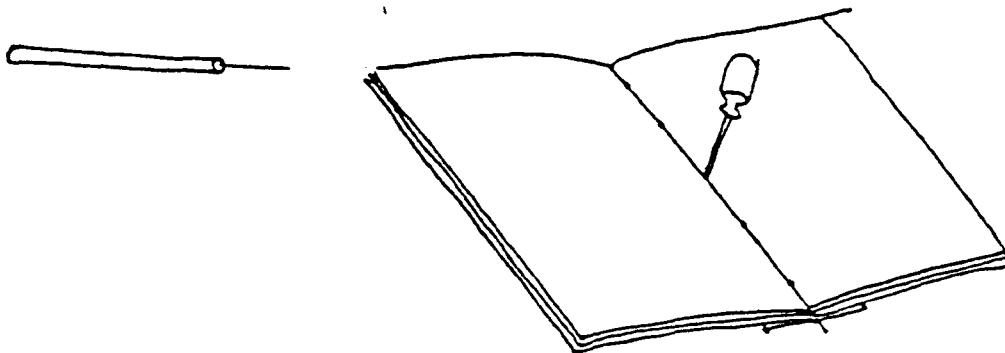
Turn pamphlet over and pry out the staple with a seesaw motion.



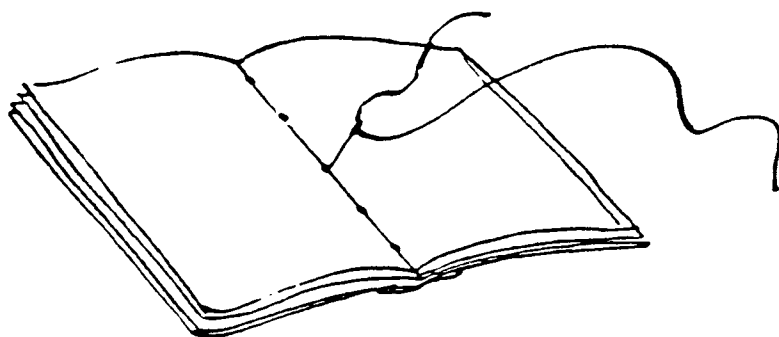
2. Fold cloth strip in half lengthwise and place around the fold of the pamphlet. Secure with plastic clips. The textured side of the cloth is facing the pamphlet.



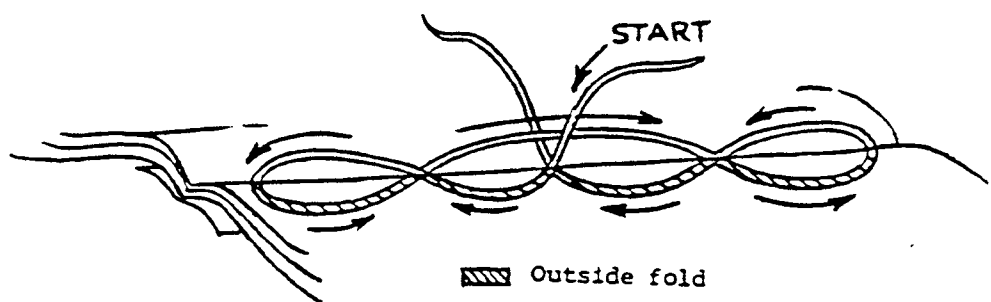
3. Open the pamphlet and stab 5 evenly spaced holes through the fold of the pamphlet and the cloth using an awl or dissection needle. Note: Taller pamphlets will need 7 holes.



4. Start sewing inside the fold, leaving a tail of thread long enough to tie a square knot.

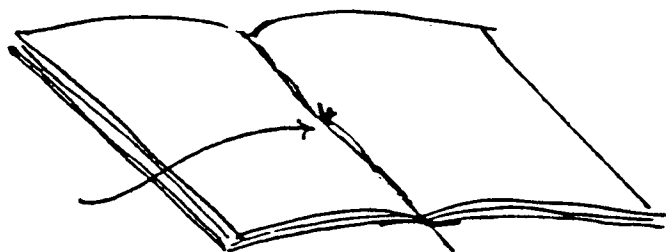
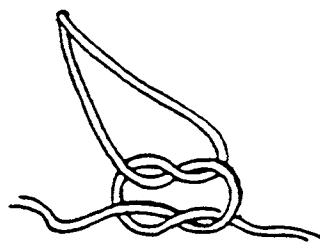


Sew in the direction of the arrows, ending in the middle where you started.



Tie a square knot (left over right, right over left) around the long center stitch.

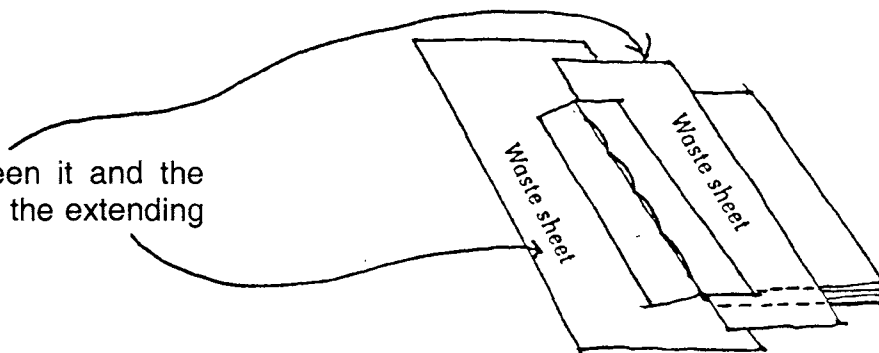
Trim the ends of the thread, leaving about  $\frac{1}{2}$ "



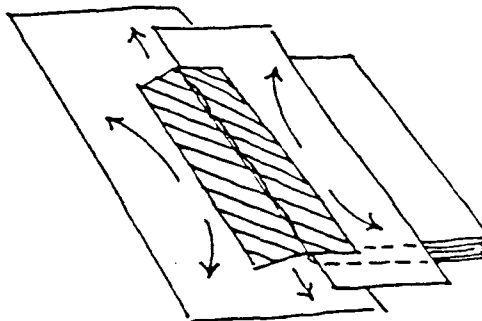


Fold the sewn cloth hinge out flat.

Put one waste sheet between it and the pamphlet and another under the extending portion.

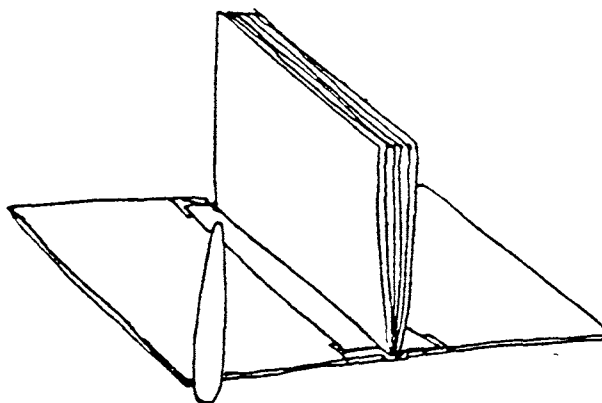


Paste in the direction of the arrows, pasting lightly over the sewing threads and very lightly and carefully at each end.



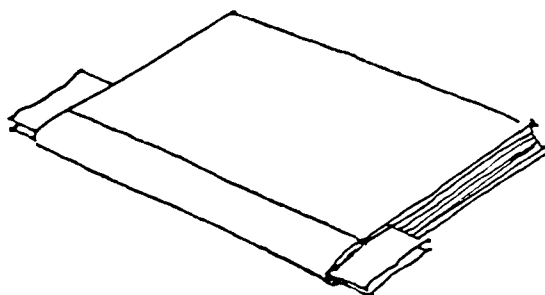
Center the fold of the pamphlet on the fold of the cover and rub down the cloth on each side with a bone folder.

Work the cloth down between the boards.



Put a strip of waxed paper on either side of the pamphlet, inside the boards and the cloth hinges you have just glued, to act as a moisture barrier.

Let the pamphlet dry overnight under a board and a weight.



## SPINE REPAIR

A common problem encountered in books is the deterioration of covering material, particularly at the spine. The material can be partially torn or completely off, while the covers are still firmly attached. The inside paper attachment between bookblock and cover is intact and not torn.

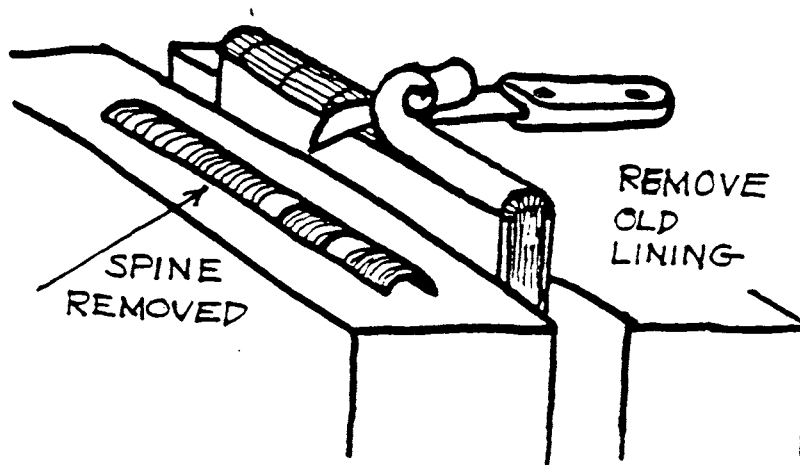
Two possible ways for replacing spine material follow

Materials and tools:

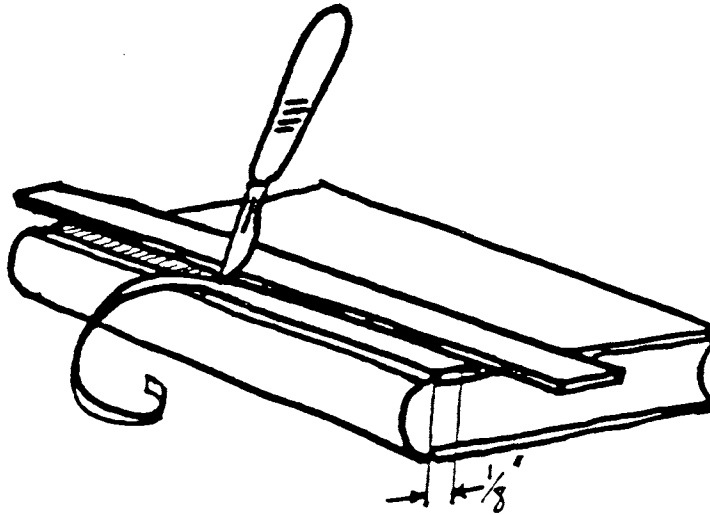
- scalpel
- steel ruler
- bone folder
- 50/50 Mixture of PVA and Methyl Cellulose, or wheat paste
- two brushes for each of the above
- kitchen knife or micro-spatula
- buckram or linen finish book cloth
- acid free bristol
- Permalife or archival bond
- waste paper

### Preparing the Bookblock

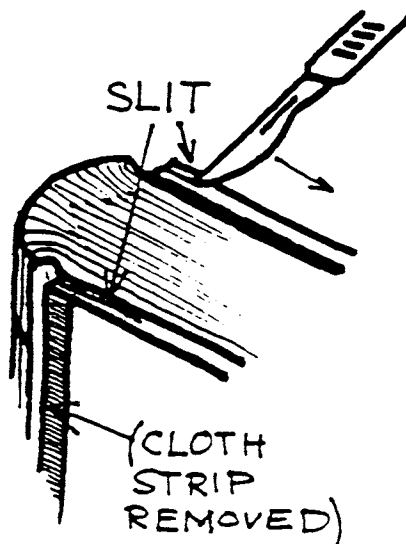
1. Remove original spine and set it aside. Remove as much as possible of the spine lining (mull, paper) by hand. If necessary, use a thick paste as a poultice to soften the old lining, but do this after the next three steps



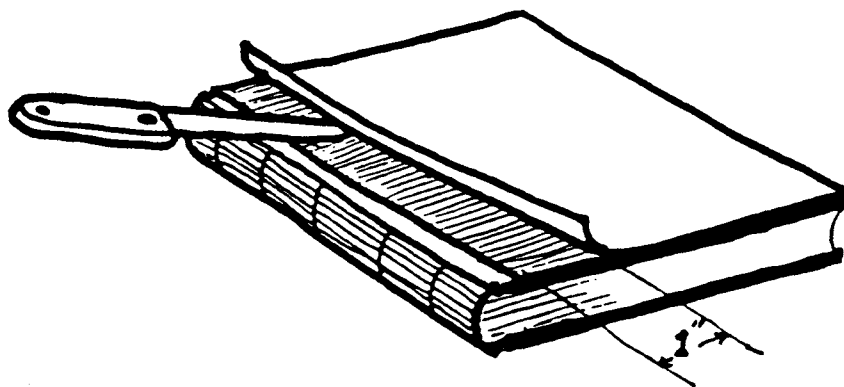
2. Place a ruler on the cover  $\frac{1}{8}$ " in from the edge on the spine side and cut the cloth with a scalpel the height of the cover. Turn book over and trim other side. Be careful not to cut into the joint (groove)-cut only on the actual book board.



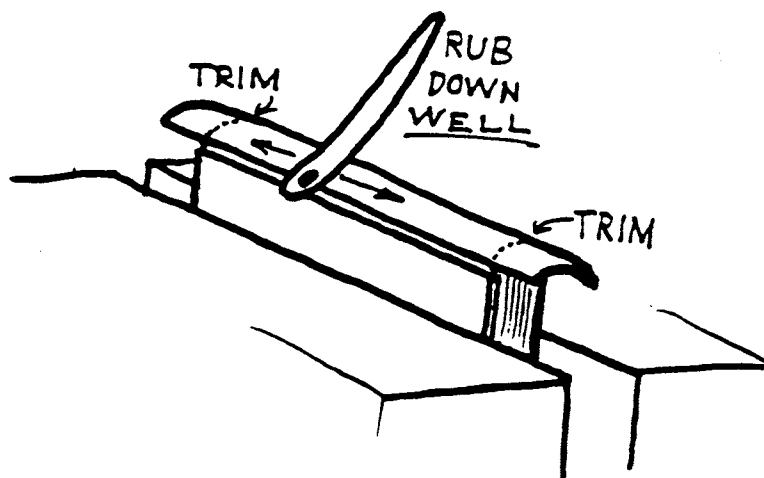
3. Using the scalpel, slit the cloth at the head and tail about 1".



4. Insert a knife (or micro-spatula) under the trimmed edge of the book cloth. Push the knife forward, lifting the cloth back about 1". Turn book over and repeat on other cover.

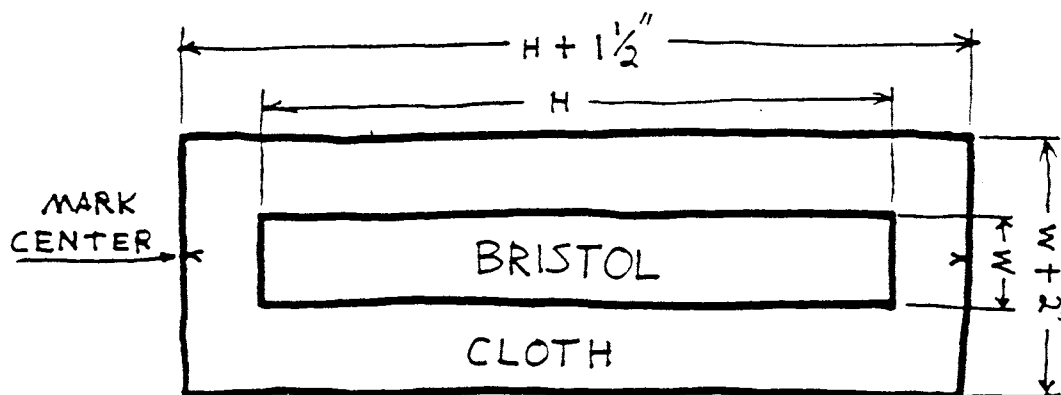


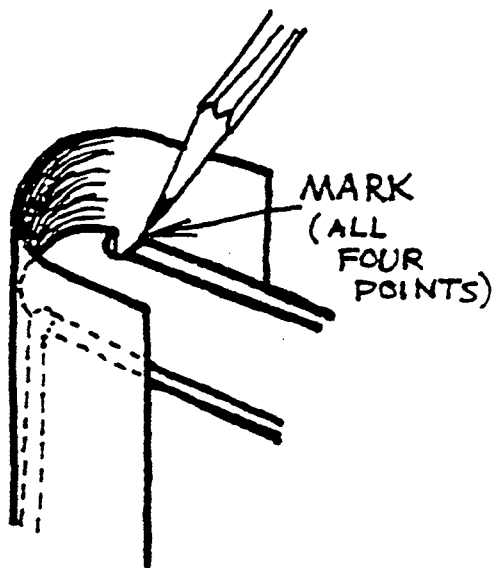
5. Cut a piece of Okawara or other light acid-free paper the width of the spine by the height of the bookblock (textblock) plus 1". (see Working Tips for measuring a curved surface). Make sure the paper strip has its grain going in the same direction as the book will open. Apply adhesive to the spine and put the paper strip down. Rub the spine well through waste paper. Trim off any excess that extends beyond the head and/or tail.



## Preparing and Attaching New Cloth Spine

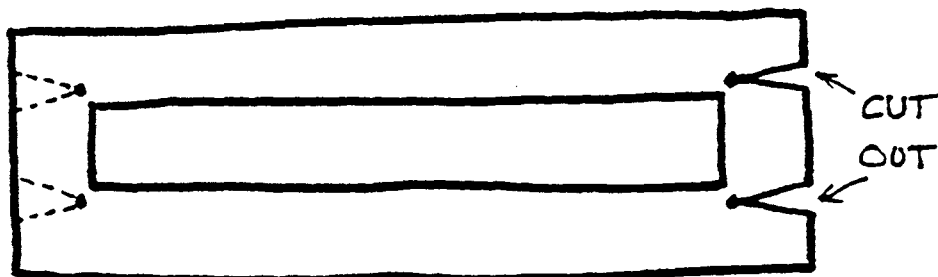
1. Select an appropriate piece of book cloth and cut it to the height of the covers plus 1  $\frac{1}{2}$ " by the width of the spine plus 2". It is important that the grain is from head to tail. Lightly fold over lengthwise, matching corners, and pinch ends to mark the center.
2. Cut a piece of bristol the height of the covers by the exact width of the spine. The grain must again be from head to tail.
3. Apply adhesive to the bristol strip. Center it on the inside of the cloth using pinched-in ends as a guide. Rub down thoroughly through waste paper.



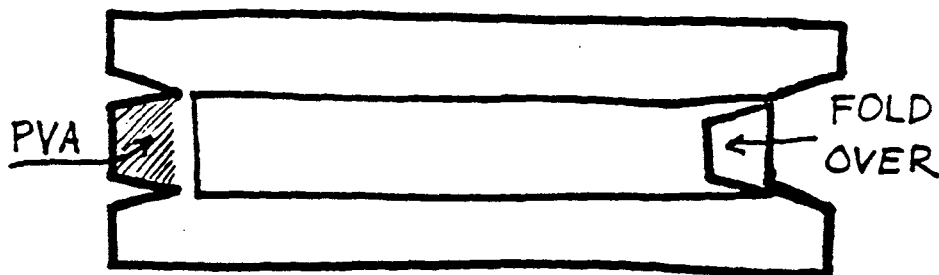


4. To prepare new cloth spine - Fold bookcloth around spine with bristol centered on spine. Mark with a pencil, on the underside of the cloth where the edges of the boards begin

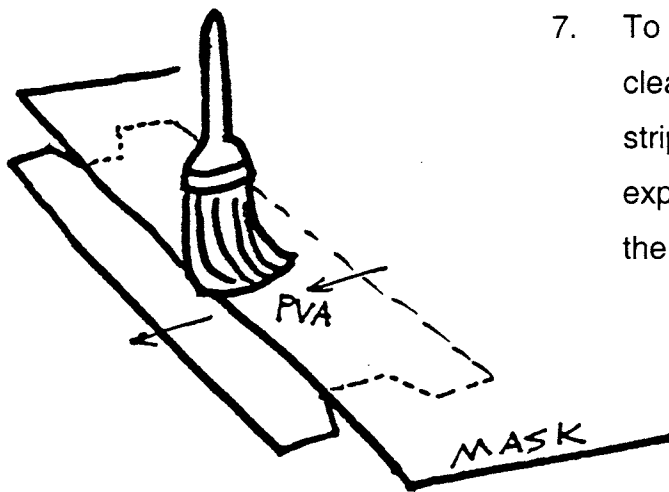
5. Cut in diagonally to each of these points removing a narrow piece.



6. Apply PVA to center flaps and fold over the bristol strip.

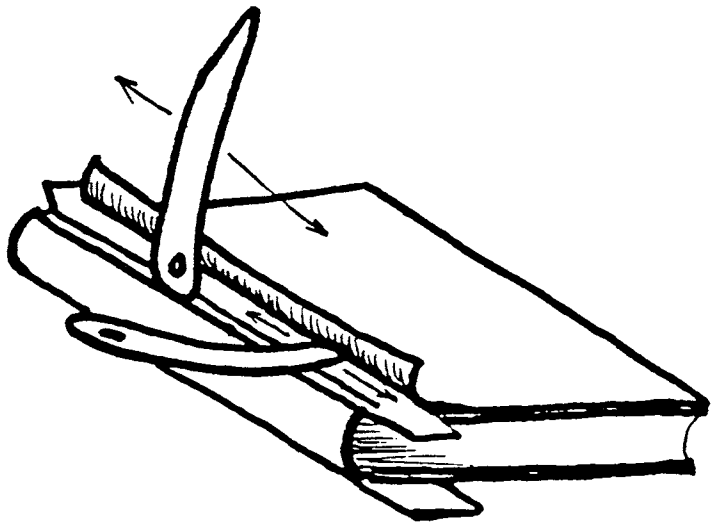






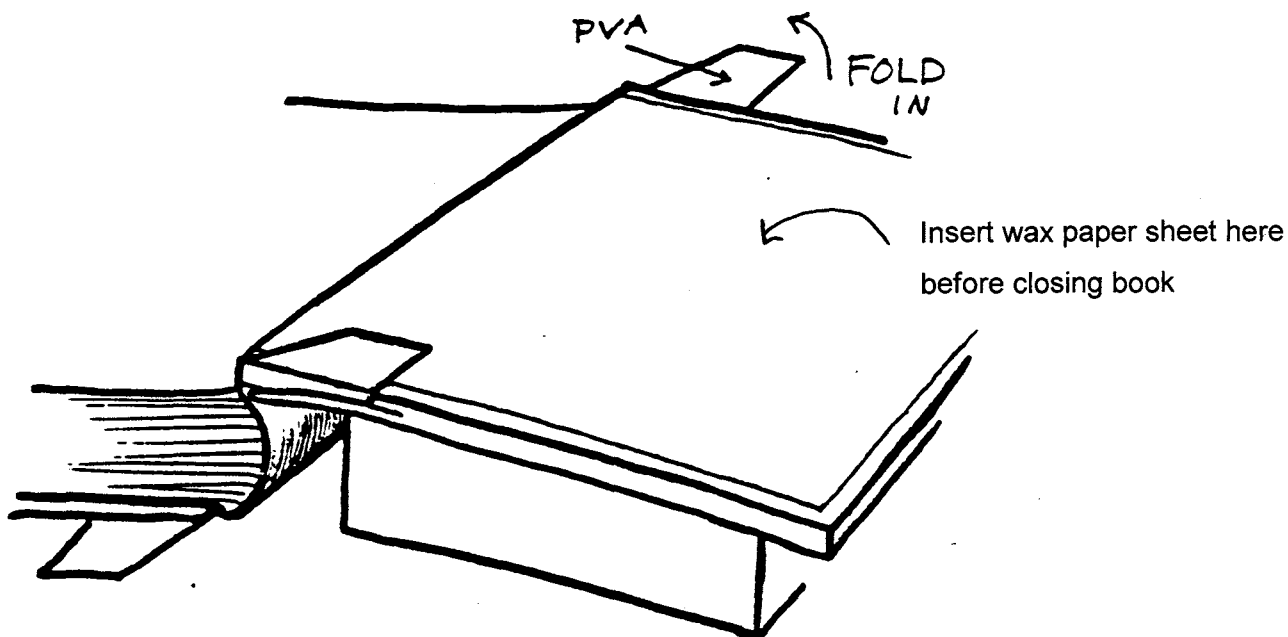
7. To attach prepared new spine, place it on clean waste paper. Mask off the bristol strip and one hinge and apply PVA to exposed hinge brushing adhesive off onto the waste paper.

8. Center bristol on spine and align it at head and tail. Place new book cloth under the lifted original cloth. With a bone folder, smooth new cloth onto the cover and mold it snugly into the joint.

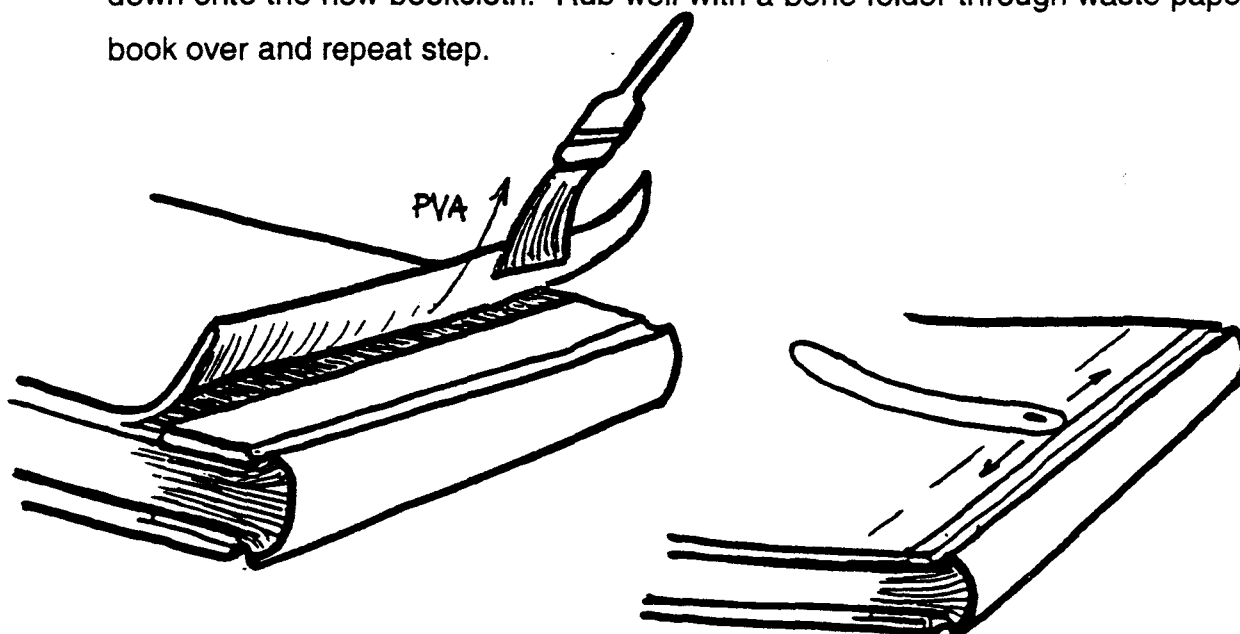


9. Turn book over and apply PVA to other cloth hinge. Inset it under lifted original cloth and finish as in above step. Check how new cloth fits around spine and onto covers before proceeding.

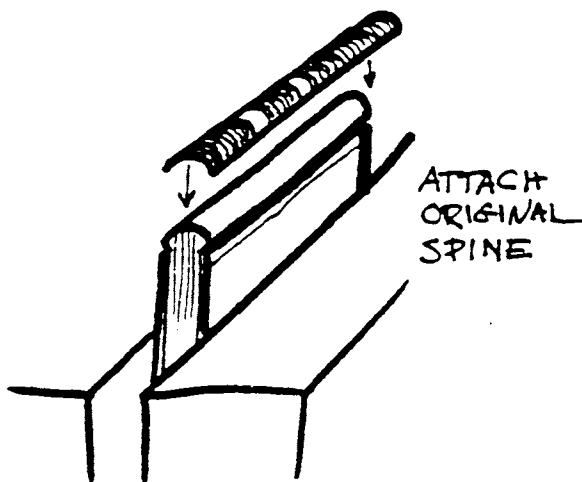
10. Open book and support cover underneath. Apply PVA to extending tabs at head and tail. Fold around edge of cover and affix to inside of cover on top of the pastedown. Insert a piece of wax paper. Close cover, turn book over and repeat step.



11. With the book closed apply PVA to the underside of the lifted original cloth and put it down onto the new bookcloth. Rub well with a bone folder through waste paper. Turn book over and repeat step.

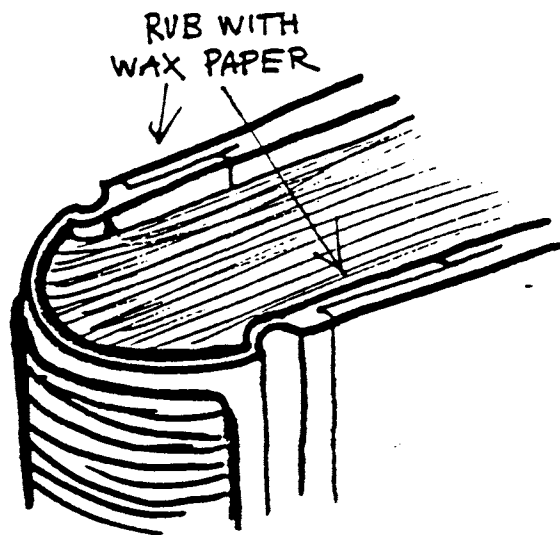


12. Remove all loose paper from the underside of the original spine. Trim to the width and height of the new spine (but no wider than new spine). Apply PVA to underside and center on new spine. Rub well through waste paper until completely affixed.



13. Place book between two boards with a weight on top, or in a press over night or until dry.

14. To secure any loose cloth ends, touch sides of boards where new cloth is turned in with a bit of PVA and burnish with waxed paper.



## HINGED TUBE

This technique is used for reattaching new publisher's case bindings that have failed at one or both hinges. Often these include Asian and Middle Eastern books with inadequate spine linings and poorly fitted covers, as well as large heavy reference and art books likely to fail prematurely at the hinges.

### Advantages:

- fast (under 1/2 hour), strong, and flexible;
- allows for sturdy reattachment of poorly fitted covers -- where hinge repairs are often tricky;
- no new endpapers -- printed endpapers can be saved;
- no lifting of pastedowns;
- can be used wherever the hinge is split -- inside cover, between fly and text;
- original covers can be reused -- no relabeling required;
- any sturdy acid free paper can be used.

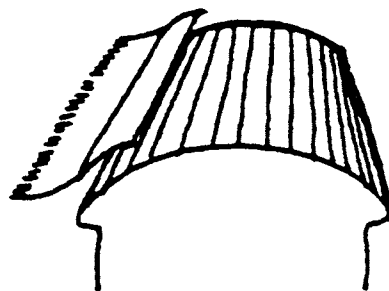
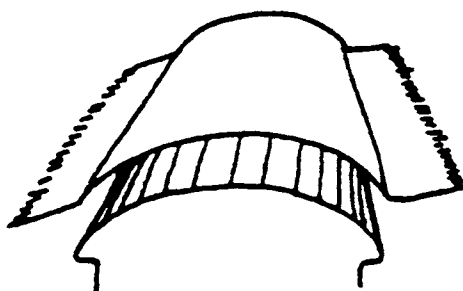
### PROCEDURE

note: A strong adhesive is required -- use PVA for all steps; except for final attachment of the hinges, where paste may be used.

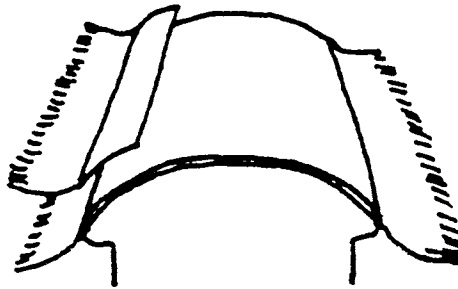
Use any sturdy machine-made paper or hand-made tissue for the tube/hinges.

1. If both hinges are broken, remove cover. If only one hinge is broken, swing the cover out of the way to expose spine. If one or both hinges are partially damaged, with the mull torn only part of the length, carefully cut open the hinge the rest of the way.
2. Place the text block in a lying press, and gently scrape away any loose lining materials
3. If you are repairing both hinges cut a strip of lining paper (an additional shoulder-to-shoulder cloth lining is optional -- before the paper lining) the height of the text and 1/2" to 1" wider than the spine, depending on how wide you want the hinges to be. The lining strip should be made of the same paper as the tube will be.

If you are repairing only one hinge, cut the strip wide enough that half the width of the strip will be the hinge, and half will be glued to the spine.

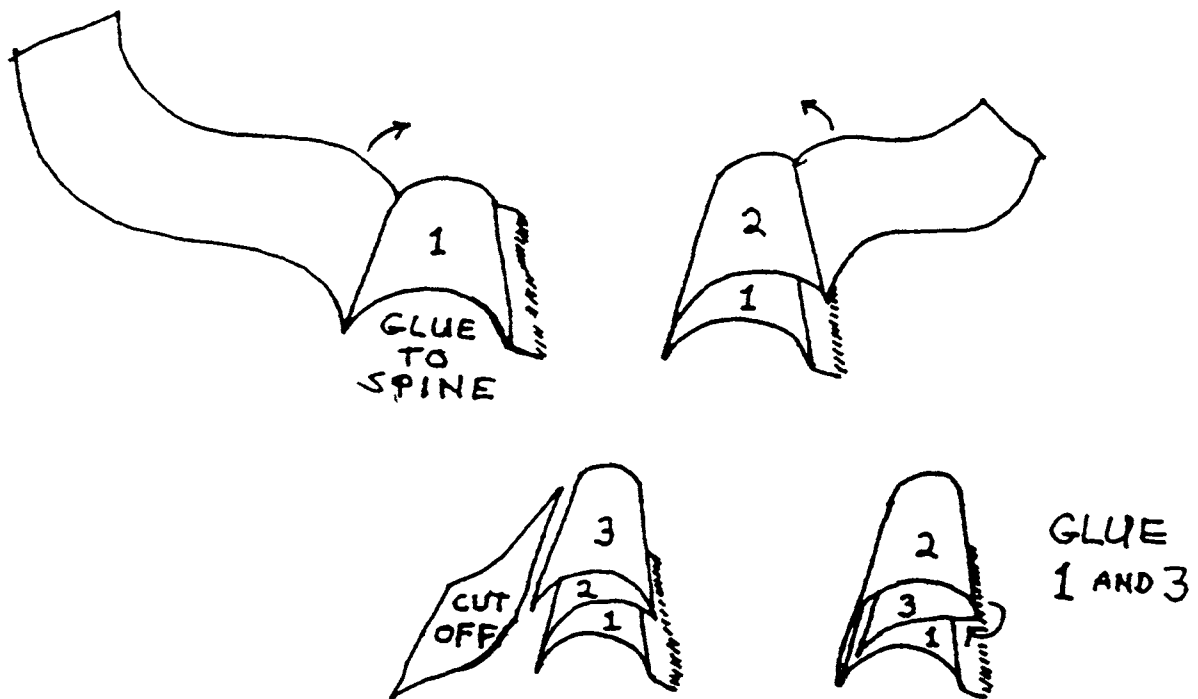


4. "Soften" the outside edges of the hinges by sanding, paring, or other means of feathering the edges.
5. Glue up the spine with PVA and attach the strip of paper with the hinge(s) extending beyond the shoulder(s).
6. If repairing both hinges, attach a second narrow strip along one shoulder, creating an overlapping hinge on that side of the text.



7. Working on the spine create a "2 on -1 off" hollow tube, modified to include a loose hinge which will overlap the existing single hinge. It is the first layer of the tube that incorporates this hinge. Be sure to feather the hinge edge before attaching the tube to the spine.

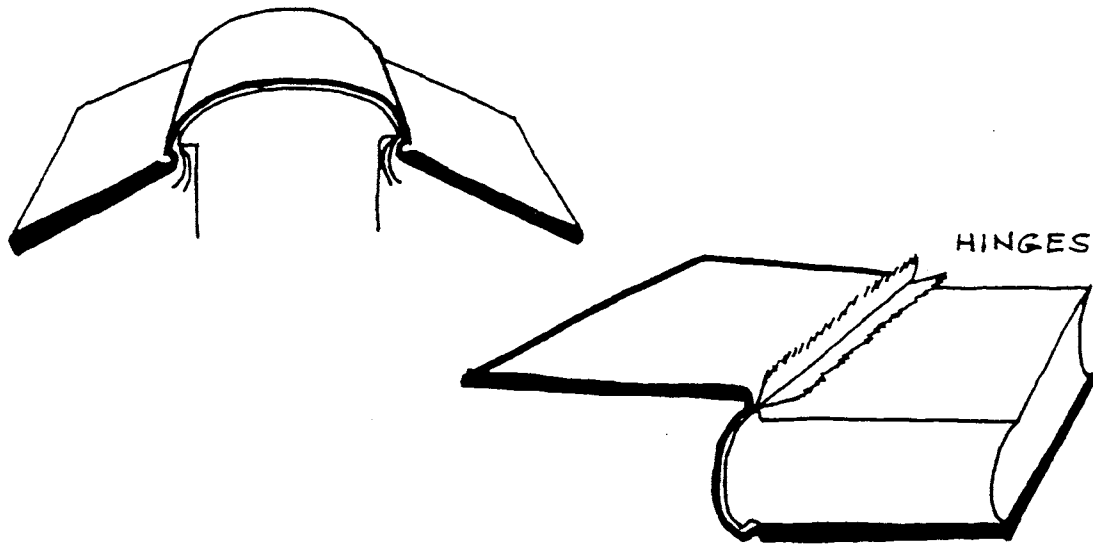
By making the tube on the spine, the folds of the tube can be matched perfectly to the edges of the shoulders. For this repair, precision is important for the hinges to work well.



8. Rub the tube down well, and let it set for just a few minutes.

9. Glue up the outside layer of the tube, being careful not to spread glue on the hinges. Remove the text block from the press and place it into its cover, aligning the cover as it was originally placed on the text.

10. Place the book back in the press and rub down the spine. It is important that the spine of the cover is in full contact with the tube, and that it is rubbed down well.



11. After several minutes, remove the book again, open carefully to the loose hinges and glue down the hinges, one at a time, using waste paper to mask the text while gluing. Insert release paper and nip the book quickly after each hinge is attached. When all hinges are attached, insert release paper and leave under moderate weight to dry.



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## WRAPPER

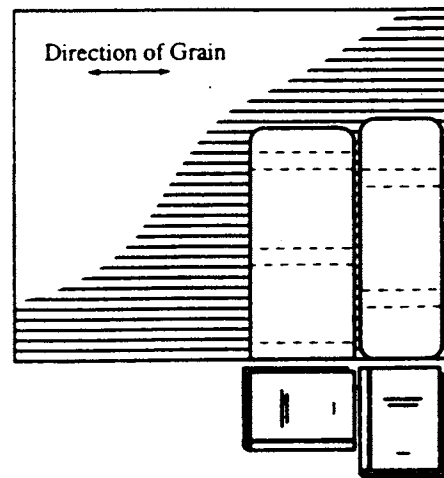
This enclosure, originally called the "Self-closing Wrapper" by Hedi Kyle who designed the wrapper, was meant to be a temporary holding device for materials waiting for rebinding or restoration. However, it has proved to be an excellent permanent enclosure for brittle and rare books as well as books from the general collection.

### Facts that must be remembered

1. All folds must run parallel to the grain  
**and**
3. This enclosure does not work well for books less than a half inch thick.

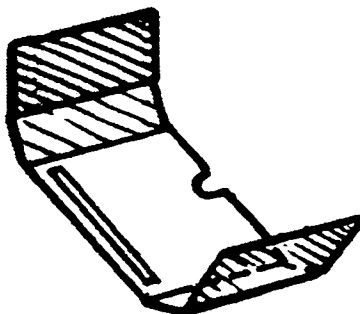
### MATERIALS:

- 20 pt Library Board, Map Folder Stock or heavy weight Bristol.
- PVA mixture
- Double-sided tape (optional)



### CUTTING AND FOLDING THE VERTICAL PIECE:

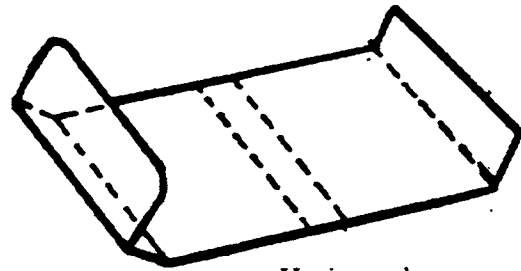
- Cut the material equal to the width of the book by 2 1/2 times the height of the book + 2 thicknesses of the book.  $W \times 2 \frac{1}{2} H + 2T$
- Cut a thumb notch with a scissors or scalpel midway on one side of the piece.
- Place the book in the center of the vertical piece. Fold the top and bottom extensions around the book and crease at the four edges of the book.
- Lay the book aside and sharpen the creases with a bone folder. Fold the vertical piece around the book again.



Vertical

## CUTTING AND FOLDING THE HORIZONTAL PIECE:

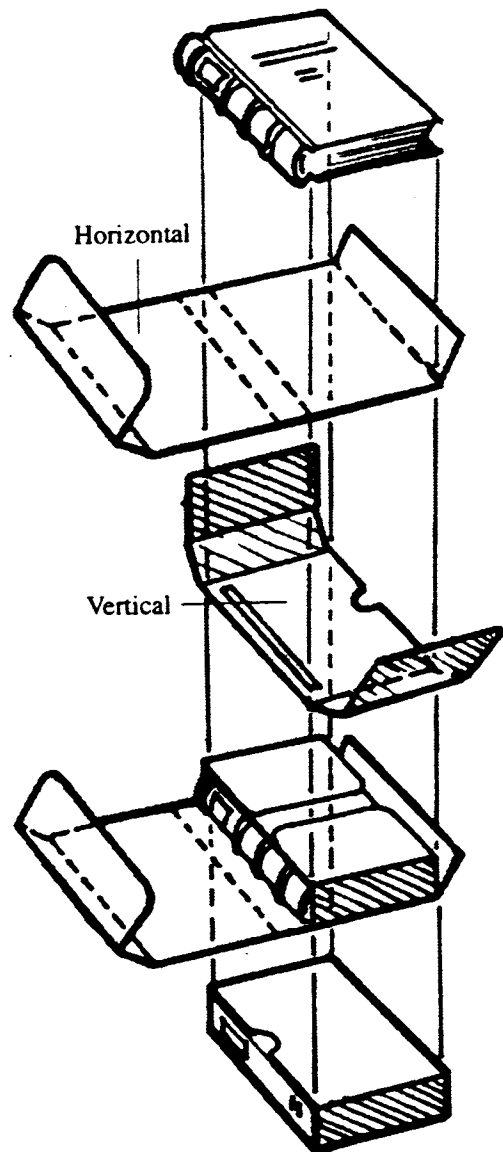
- Measure and cut the material the height of the wrapped book by 2 times the width of the book + 3 book thickness, + 2"H x 2W + 3T + 2".
- Make the first fold a little less than one thickness on the foredge side of the book and stand it up straight.
- Push the book against the first fold and continue to fold the material around the book (as was done with the vertical piece). Lay the book aside and sharpen all creases with a bone folder.



Horizontal

## ASSEMBLING THE VERTICAL AND HORIZONTAL PIECES:

- Test the fit of the wrapper by placing the horizontal piece on top of the vertical piece. Lay the book in the center and fold the top and bottom vertical flaps over the book. Fold the horizontal flap around and tuck the 2" flap under the vertical piece at the thumb notch.
- Take the book out of the wrapper. Sharpen all folds. Either use a corner rounder or angle off all corners except the first horizontal flap.
- Reassemble the wrapper, remove the paper backing of the double-sided tape and press the parts together.
- Place the book inside and refold, tucking in the last flap. The wrapper is ready to be titled.



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## POCKETS

**NOTE:** A heavy weight acid-free envelope may be glued to the inner board(s) or hinged-in at the back and/or front of the book instead of constructing a pocket if desired.

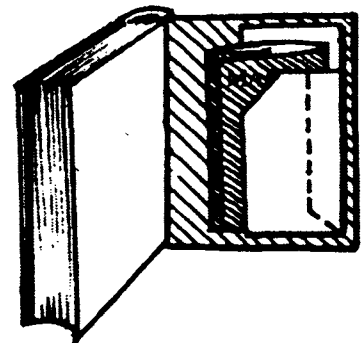
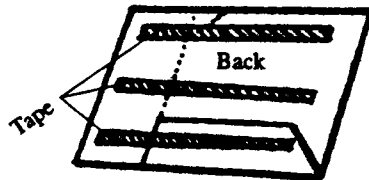
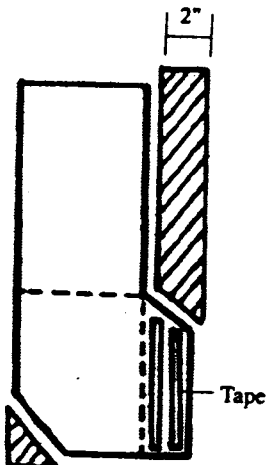
There are materials, such as a map, that belong with a book but should not be attached to it. A pocket attached inside the back cover keeps such material secure and ready for use. However, anything that is too thick strains the binding and another solution must be found for the material.

Cut a rectangle of bristol or another similar paper, with the grain in the long direction. The width is equal to the width inside the cover plus 2". The length is approximately 1 and 2/3 the height of the cover. These measurements need not be exact, so measure with your eye and adjust the material to the size of what goes inside the pocket.

Score and fold the bristol so that it is a bit less than the height of the cover. With a scalpel cut off 2" of the upper part on the right side. Also cut off an angle below the fold and trim off the corner on the lower left side.

Score and fold the lower flap upward. Attach two strips of double-sided tape on the small flap. Place the material on the bristol and fold the lower flap up and the smaller flap around to the back. Turn the pocket over and remove the paper on the tape and press it down.

Put three strips of double-sided tape on the back of the pocket. Position it inside the back cover. Carefully remove the paper on the tape and press the pocket down.



## TIGHTENING BOOKS IN THEIR CASES

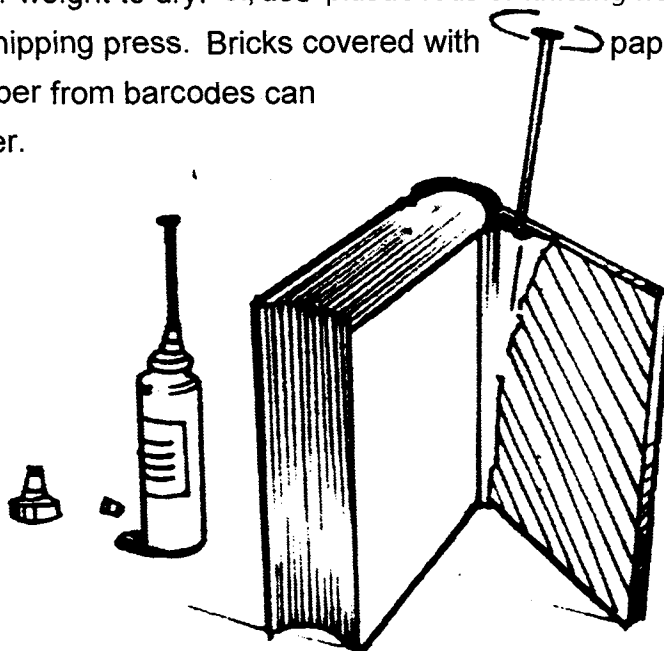
This repair appears when the pastedown has pulled away from the inside of its case. The condition can be caused when the book has not been properly attached to the case, or the book has been shelved on its foredge allowing the bookblock to pull loose and drop down. This is more frequent with books that have a heavy or an oversize text.

### Materials Needed:

- PVA not diluted
- A tall bottle with a narrow opening
- Thin knitting needle - No. 3
- Wax paper
- Bone folder

Stand the book upright. Place a finger between the spine and the spine of the case so that the area where the pastedown has separated from the board is visible. Insert the PVA coated needle into the space at the hinge area as far as down as possible and pull the adhesive off the needle. Be careful to not get any adhesive into the spine area. Repeat on the other hinge.

Insert wax paper between endpapers, set the joint of the book and nip in a press for a few minutes. Place under weight to dry. Or, use plastic rods or knitting needles with a board and weights if you do not have a nipping press. Bricks covered with paper or book cloth can be used for weights. Release paper from barcodes can be used as wax paper.





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### HAND TOOLS

**Awl or Potter's Needle** - For piercing holes when sewing, also for scoring Japanese paper when preparing guards and hinges.

**Bone Folder** – Various shapes and sizes. A pointed folder works well for scoring and creasing. A broad, rounded folder is for rubbing and smoothing a surface.

**Brushes** - Polyester brushes for PVA and mixture in several widths - 1/4", 1/2", 3/4" and 1". A small watercolor brush can be used to water-tear Japanese paper for mending and guarding.

**Needle** - #1, #3, and #4 darners are good all-around needles.

**Pencil** - used to mark work if necessary. Easily erased, unlike ballpoint marks that cannot be removed.

**Rulers** - See-through for viewing exact measurements ; metal ruler for cutting against

**Sandpaper** - Softens edges of boards, knocking off points of cover corners. An emery board gets into tight places.

**Scalpel** - Used for precise cutting and trimming. Blade can be replaced when dull. # 3 handle uses # 10 blade, #4 handle uses #23 blade and #5 handle uses # 11 blade.

Knives with break-away blades may also be used.

**Spatula** - Lifts paper, staples, and other material.

**Scissors** - 8" to 12" of good quality - Fiskars, rug shears, small sewing scissors.

**Triangle** - Used to check right angles when cutting or marking.

**Tweezer** - Used to pick up small/delicate pieces of paper.



## DEPARTMENT SUPPLIES

**Western Papers** – 80 Lb Permalife, Mohawk for endpapers.

**Lightweight Bristol Map Folder Stock** - for pockets.

**Waste paper** - large sheets and strips for pasting, not printed newspapers

**Wax Paper** - to serve as a buffer.

**Japanese Papers** - Hosho, Okawara, Kizukishi, Sekishu for tear repair, guarding, backing

**Heat Set** - Cromptons, Cerex, Silicone Release Paper.

**Tacking Iron** - For attaching heat set tissue.

**Thread** - Must be linen. #18 is a good weight for sewing pamphlets. #25 or 30 for sewing text gatherings. The smaller the number the heavier the thread, larger number thread is lighter weight.

**Tyvek** - a light weight, non paper, used as an alternative to paper.

**Blotting Paper** - Felted paper used to remove excess moisture or as a support.

**Polyester Web** – Durable non-woven material to which other materials do not stick.  
Examples: Reemay or Hollytex.

**Adhesives** – Jade 403, Elvace, Methyl Cellulose, Pastes.

**Repair Tape** - Filmo-plast, Ademco for mending tears.  
3M Double-sided tape to attach parts.

**Polyester Film** - .003 or .004 mil Melinex for encapsulation.

**Pressing Boards** - Different sizes.

**Weights** - Covered bricks, small lead pieces, etc.

**Bulldog Clasp** - To hold material together.

**Cutter** - Largest possible table model with pressure bar and side gauge. Paper cutter not acceptable because materials slip when being cut.

## **SUPPLY LIST**

### **ADHESIVES/PASTE**

**PVA** (polyvinyl acetate) - Brodart,  
Gaylord, Light Impressions,  
Talas(Jade), University Products  
**Mythyl Cellulose** - Talas  
**Wheat Paste** - Talas

### **BOARD**

**Bristol** - Talas, University Products  
**Folder Stock** -Gaylord, University  
Products  
**Pressboard** (pamphlet binders) -  
Gaylord, Talas, University Products

**BONE FOLDERS** - Brodart, Demco,  
Gaylord, Talas, University Products

**BOOK CLOTH** - Cover Materials,  
Gaylord, Talas, University Products

**BOOK JACKET COVERS** - Brodart,  
Demco, Gaylord, Kapco, University

**BOXES** (for archival storage) Hollinger,  
Light Impressions, Talas, University  
Products

**BRUSHES** - Brodart, Demco, Gaylord,  
Talas, University Products, or any  
hardware/department store

**CUTTING MATS** - Demco, Gaylord,  
University Products

**DATE DUE SLIPS** - Brodart, Demco,  
Gaylord, University Products

**ENVELOPES** - Gaylord, University  
Products

**ERASERS** - Brodart, Demco, Gaylord,  
University Products

### **HUMIDITY TEMPERATURE**

**INDICATORS** - Gaylord, Light  
Impressions, University Products

**LABEL PROTECTORS** - Brodart,  
Demco, Gaylord, University Products

### **PAPER**

**Acid-free** - Gaylord, Light Impressions,  
Talas, University Products  
**Japanese** (Sekishu)-Gaylord, Talas,  
University Products

**POLYESTER FILM** - Demco, Light  
Impressions, Talas, University Products

### **TAPE**

**Archival (Document) Repair** - Brodart,  
Products Demco, Gaylord, Light  
Impressions, Talas, University Products  
**Book Repair** - Demco  
**Double-sided** - Brodart, Demco,  
Gaylord, Light Impressions, Talas,  
University Products

**THREAD (Binders)** - Brodart, Gaylord,  
Talas, University Products

Compiled by Sue Dunlap, Preservation  
Manager. The College of Wooster  
Libraries  
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## VENDORS

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Robert H. Patterson, ed. *The University of Tulsa*, McFarlin Library, 600 South College Avenue, Tulsa, OK 74104.

*New Library Scene*. Sally Grauer, ed. Library Binding Institute, 150 Allens Creek Road, Rochester, NY 14618.



## **WEB SITES AND MANUALS ON BOOK PRESERVATION (updated 11-2009)**

**Amigos Library Services: Innovative information services in education and information services.** <http://www.amigos.org/>

**Canadian Conservation Institute. Conservation Information Database: a growing database of information on a variety of conservation topics and questions, written by CCI staff and their research collaborators.**  
<http://www.cci-icc.gc.ca/crc/cidb/index-eng.aspx>

**The Library of Congress:** <http://www.loc.gov/preserv/> (Book Preservation information)

**American Institute for Conservation of Historic and Artistic Works: a national membership organization of conservation professionals dedicated to preserving the art and historic artifacts of our cultural heritage for future generations.**  
<http://www.conservation-us.org/>

**Heritage Preservation: The National Institute for Conservation. Helps museums, libraries, and individuals with the best preservation advice from professional conservators:** <http://www.heritagepreservation.org/>

**Conservation OnLine (DistList): Resources and discussion site for Conservation professionals.** <http://cool.conservation-us.org/byform/mailling-lists/cdl/>

**Northeast Document Conservation Center, Preservation Leaflets. Preservation of library and archival materials.** <http://www.nedcc.org/resources/leaflets.list.php>

**Lyrasis Preservation Leaflets (formerly Solinet):**  
<http://www.lyrasis.org/Preservation/Resources-and-Publications.aspx?ViewAll=1&tab=3>

**A Simple Book Repair Manual, created by members of Preservation Services, Dartmouth College Library.**  
<http://www.dartmouth.edu/~preserve/repair/repairindex.htm>

**Conservation Book Repair: A training manual by Artemis BonaDea. Illustrated by Alexandria Prentiss, Alaska State Library, Alaska Department of Education, 1995**  
<http://www.library.state.ak.us/hist/conman.html>

**Bookbinding: A Tutorial by Douglas W. Jones. The University of Iowa, Department of Computer Science and Center for the Book.**  
<http://www.cs.uiowa.edu/~jones/book/>

**Book Repair Manual, Robert J. Milevski:**  
<http://www.lib.niu.edu/1995/il950276.html>

